

GENERAL NOTES

DESIGN:

IN ACCORDANCE WITH THE 2014 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION WITH CURRENT INTERIM SPECIFICATIONS THROUGH 2015 AND THE 2009 AASHTO LRFD GUIDE SPECIFICATIONS FOR THE DESIGN OF PEDESTRIAN BRIDGES, FOR HL-93 LOADING.

MASSDOT BENCH MARK:

PK FND 80652
N2982263.073 E684685.815
STA. 29+03.05 5.74' LT
EL. 191.978'

REBAR CAP 90000
N2982228.720 E684648.018
STA. 28+70.78 45.33' LT
EL. 190.533'

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

MASSDOT SURVEY NOTEBOOKS:

COPIES OF ELECTRONIC SURVEY FILES MAY BE OBTAINED FROM THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION – HIGHWAY DIVISION.

SCALES:

SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZED PRINTS. DIVIDE SCALES BY 2 FOR HALF-SIZE PRINTS (A3).

FOUNDATIONS:

FOUNDATIONS MAY BE ALTERED, IF NECESSARY, TO SUIT CONDITIONS ENCOUNTERED DURING CONSTRUCTION, WITH THE APPROVAL OF THE ENGINEER.

UNSUITABLE MATERIAL:

ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATIONS OF THE STRUCTURE, AS DIRECTED BY THE ENGINEER.

SEISMIC GROUND SHAKING HAZARD:

DESIGN RETURN PERIOD: 1000 YEARS

DESIGN SPECTRA:

As = 0.116
Sds = 0.239
SD1 = 0.095

SITE CLASS = D

SEISMIC DESIGN CATEGORY (SDC) = A

ANCHOR BOLTS:

ALL ANCHOR BOLTS SHALL BE SET BY TEMPLATE BEFORE THE CONCRETE IS PLACED.

REINFORCEMENT:

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60 (EPOXY COATED). UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

MODIFICATION CONDITION	#4 BARS	#5 BARS
1. NONE	21"	26"
2. 12" OF CONCRETE BELOW BAR	29"	36"
3. COATED BARS, COVER < 3db, OR CLEAR SPACING < 6db	31"	39"
4. COATED BARS, ALL OTHER CASES	25"	31"
5. CONDITION 2. AND 3.	35"	44"
6. CONDITION 2. AND 4.	34"	43"

IF THE ABOVE BARS ARE SPACED 6" OR MORE ON CENTER, THE LAP LENGTH SHALL BE 80% OF THE LAP LENGTH GIVEN ABOVE. ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.

CONCRETE MIXES:

(1)	(2)	(3)	TO BE USED IN CONSTRUCTION OF:
4000	1½	565	FOOTINGS, PEDESTAL WALLS, AND WINGWALLS

- (1) 28 DAY COMPRESSIVE STRENGTH (PSI)
(2) MAXIMUM AGGREGATE SIZE (INCH)
(3) CEMENTITIOUS CONTENT (POUNDS/C.Y.)

CONTRACTOR DESIGNED OPTION:

THE CONTRACTOR MAY ELECT TO SUBMIT AN ALTERNATIVE DESIGN FOR SUBSTRUCTURE ELEMENTS (FOOTINGS, PEDESTAL WALLS, AND RETAINING WALLS). DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE FABRICATION OR INSTALLATION OF ANY CONTRACTOR DESIGNED ELEMENTS COMMENCES. IF THE CONTRACTOR PROPOSES PRECAST FOOTINGS, CONSTRUCTION JOINT LOCATIONS SHALL BE STAGGERED A MINIMUM OF 18" FROM PRECAST WALL UNIT CONSTRUCTION JOINTS.

THE DESIGN OF THE PEDESTAL WALL FOOTING AND STEM DETAILED HEREIN IS BASED UPON THE ASSUMED GEOMETRY OF THE ARCH UNITS SHOWN. THE CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL A COMPLETE REDESIGN OF THE PEDESTAL WALL FOOTING AND STEM SHOULD THE GEOMETRY OF THE PRECAST ARCH UNITS VARY FROM THAT SPECIFIED ON THE PLANS.

CONSTRUCTION LOADING:

CONSTRUCTION SURCHARGE LOADING SHALL BE LIMITED TO 350 PSF BEHIND PROPOSED PEDESTAL WALLS AND 260 PSF BEHIND PROPOSED WINGWALLS.

POWDER MILL ROAD CLOSURE:

FOR POWDER MILL ROAD CLOSURE AND DETOUR DETAILS SEE HIGHWAY PLANS.

ANTI-GRAFFITI COATING:

THE CONTRACTOR SHALL APPLY AN ANTI-GRAFFITI CLEAR COATING TO THE EXPOSED CONCRETE PORTIONS OF THE WINGWALLS, PEDESTAL WALLS, AND ARCH THAT WILL NOT CHANGE THE APPEARANCE OF THE STAINED CONCRETE.

EXISTING FOUNDATIONS:

LIMITS OF EXISTING FOUNDATIONS SHOWN ON THESE PLANS IS UNKNOWN. THE CONTRACTOR IS ALERTED THAT THESE FOUNDATIONS MAY STILL EXIST BURIED BEHIND THE EXISTING METAL PIPE CULVERT FILL MATERIAL. PLANS FOR THE EXISTING PIPE CULVERT MAY BE SEEN AT THE OFFICE OF THE BRIDGE ENGINEER, MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, 10 PARK PLAZA, BOSTON, MASSACHUSETTS.

ESTIMATED QUANTITIES

(NOT GUARANTEED)

ITEM DESCRIPTION	QUANTITY	UNIT
CULVERT EXCAVATION	2,670	CY
GRAVEL BORROW FOR BRIDGE FOUNDATION	180	CY
GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	1,530	CY
CULVERT STRUCTURE, CULVERT NO. C-19-015 (BQA)	1	LS

CONCORD
BRUCE FREEMAN RAIL TRAIL PHASE 2C

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-----	259	328
PROJECT FILE NO. 605189			

GENERAL NOTES AND ESTIMATED QUANTITIES

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-----	260	328
PROJECT FILE NO. 605189			

BORING LOGS (1 OF 2)

BORING BB-3

massDOT NEW HAMPSHIRE BORING, INC. P.O. Box 165 Derry, NH 03038		Phone: (603)437-1610 Fax: (603) 437-0034 E Mail: nhb@nhboring.com		Boring No. BB-3 Scale 1" = 5'	
City/Town: Concord		Bridge: C-19-015		Project File No: 605189 Contract No: 76859	
Project: Powder Mill Road over Bruce Freeman Rail Trail *		Date & Time Started: 5/12/15 8:00 am		Total Hours: 7	
Groundwater Depth: 20'+/-		Date & Time: 5/12/15 8:00 am		Date & Time Completed: 5/12/15 3:00 pm	
Coordinates: N 2982233.36 E 684704.67		Driller's Name: Walter Hoeckele		Helper's Name: William Walsh	
Ground Elevation: 192.5'		Inspector's Name: Anthony Leonido		Inspector's Company: Nobis Engineering Corp. for *	
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot		Recovery Inches	Field Description
S-1	6" - 2'	9	9	9	10" ASPHALT Dry, medium dense, brown, FINE TO COARSE SAND, some fine to medium gravel, trace inorganic silt.
S-2	2' - 4'	8	6	11	13" Dry, medium dense, brown/grey, FINE TO COARSE SAND, some fine gravel, trace inorganic silt.
S-3	4' - 6'	27	21	6	10" Dry, medium dense, brown, FINE TO COARSE SAND, some fine gravel, trace inorganic silt.
S-4	6' - 8'	25	21	19	13" Dry, dense, brown, FINE SAND, some fine to medium gravel, trace inorganic silt.
S-5	8' - 10'	21	22	21	10" Moist, dense, brown, FINE TO COARSE SAND and medium gravel, trace inorganic silt.
S-6	10' - 12'	26	21	21	12" Moist, dense, brown, FINE TO COARSE SAND and fine gravel, trace inorganic silt.
S-7	12' - 14'	16	13	16	15" Moist, medium dense, brown, FINE TO COARSE SAND, some inorganic silt, trace fine gravel.
S-8	14' - 16'	11	12	4	7" Moist, medium dense, brown, FINE TO COARSE SAND and medium gravel, trace inorganic silt.
S-9	16' - 18'	17	22	23	19" Moist dense dark brown, FINE TO COARSE SAND and fine gravel, trace inorganic silt.
S-10	18' - 20'	12	10	8	9" Moist, medium dense, brown, FINE TO COARSE SAND, some fine gravel, trace inorganic silt.
S-11	20' - 22'	8	9	6	5" 3" Wet, medium dense, brown, FINE TO COARSE SAND, fine gravel, some wood fragment, trace inorganic silt.
S-12	22' - 24'	9	9	9	10" 2" Wet, medium dense, brown, FINE TO COARSE SAND, some fine gravel, trace wood fragments, trace inorganic silt.
S-13	24' - 26'	15	15	12	9" 5" Wet, medium dense, brown, FINE TO COARSE SAND, some fine gravel, some inorganic silt.
S-14	26' - 28'	9	8	13	14" 10" Wet, medium dense, brown, FINE SAND, trace inorganic silt.
S-15	28' - 30'	11	10	11	13" 10" Wet, medium dense, brown, FINE SAND, trace inorganic silt.
S-16	34' - 36'	8	14	10	16" 12" Moist, medium dense, brown, FINE SAND, trace inorganic silt.
S-17	39' - 41'	12	15	16	22" 13" Moist, dense, brown, FINE SAND, trace coarse sand, trace inorganic silt.
S-18	44' - 46'	26	28	26	30" 9" Moist very dense, brown, FINE TO COARSE SAND, some coarse gravel, trace inorganic silt.
S-19	49' - 51'	15	14	14	15" 18" Wet, medium dense, brown, FINE TO COARSE SAND, some fine gravel, trace inorganic silt.
Bottom of Exploration = 51'				51'	

Notes: * Phase II C * Greenman Pederson Inc.		Protective Device - Stand: Box:	
** Safety Hammer Weight: CatHead140lbs		Well Depth: Solid Pipe:	
Penetration Resistance (N) Guide:		Stick Up Pipe: Screen Pipe:	
Cohesionless Soils (Sands, Gravels)		Type of Drill Rig: Dierich D-50	
Cohesive Soils (Sills, Clays)		Casing Type: HW Size: 4" Depth: 5'	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
N=Sum of Second and Third 6" Blow Counts		Hard	Over 30
Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less		Core Barrel Type:	Size:

BORING BB-4

massDOT NEW HAMPSHIRE BORING, INC. P.O. Box 165 Derry, NH 03038		Phone: (603)437-1610 Fax: (603) 437-0034 E Mail: nhb@nhboring.com		Boring No. BB-4 Scale 1" = 5'	
City/Town: Concord		Bridge: C-19-015		Project File No: 605189 Contract No: 76859	
Project: Powder Mill Road over Bruce Freeman Rail Trail *		Date & Time Started: 5/11/15 9:00 am		Total Hours: 7	
Groundwater Depth: 19'+/-		Date & Time: 5/12/15 8:45 am		Date & Time Completed: 5/12/15 9:00 am	
Coordinates: N 2982182.22 E 684688.08		Driller's Name: Kenneth Smith		Helper's Name: Cody Richards	
Ground Elevation: 170.5'		Inspector's Name: Anthony Leonido		Inspector's Company: Nobis Engineering Corp. for Greenman Peterson Inc.	
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot		Recovery Inches	Field Description
S-1	0' - 1'6"	5	6	10	14" 12" Dry, medium dense, brown to dark brown, FINE SAND, trace fine gravel.
S-2	2'6" - 4'6"	2	6	6	8" 10" Encountered BOULDER, roller bit through.
S-3	4'6" - 6'6"	3	3	3	10" 20" Moist, medium dense, brown, FINE SAND, trace fine gravel.
S-4	9' - 11'	6	6	9	8" 13" Moist, loose, brown, FINE SAND.
S-5	14' - 16'	8	9	10	12" 13" Moist, medium dense, brown, FINE TO COARSE SAND.
S-6	19' - 21'	10	9	11	13" 12" Moist, medium dense, brown, FINE SAND.
S-7	24' - 26'	11	11	14	15" 13" Wet, medium dense, brown, FINE SAND.
S-8	29' - 31'	8	8	10	15" 9" Wet, medium dense, brown, FINE TO COARSE SAND, trace fine gravel.
Bottom of Exploration = 31'				31'	

Notes: * Phase II C Changed location; moved boring prior to drilling from N2982182.96, E684697.57 to 2982182.22, E684688.08 so the monitoring well would not be installed in the middle of the trail.		Protective Device - Stand: Box:	
Well Depth: 30' Solid Pipe: 18'		Stick Up Pipe: 3' Screen Pipe: 15'	
Penetration Resistance (N) Guide:		Type of Drill Rig: Mobile B-51	
Cohesionless Soils (Sands, Gravels)		Casing Type: NW Size: 3" Depth: 30'	
Cohesive Soils (Sills, Clays)		Hammer Weight: 300lbs Fall: 24"	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
N=Sum of Second and Third 6" Blow Counts		Hard	Over 30
Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less		Core Barrel Type:	Size:

BORING NOTES:

- LOCATION OF BORINGS SHOWN ON THE PLAN THUS: BB-1
- BORINGS ARE TAKEN FOR THE PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
- WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
- FIGURES IN THE COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1 1/8" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
- BORING SAMPLES ARE LOCATED AT A STORAGE FACILITY LOCATED ON ROUTE 114 (219 WINTHROP AVE.) IN LAWRENCE, MA. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING THE MASSDOT GEOTECHNICAL SECTION AT 10 PARK PLAZA, BOSTON, MA.
- ALL BORINGS WERE MADE IN MAY, 2015.
- BORINGS WERE MADE BY NEW HAMPSHIRE BORING, INC. OF DERRY, NH UNDER THE GUIDANCE OF NOBIS ENGINEERING, INC.
- THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

GROUND WATER MONITORING WELL MEASUREMENTS (BB-4)	
DATE	ELEVATION
5/12/2015	148.0'

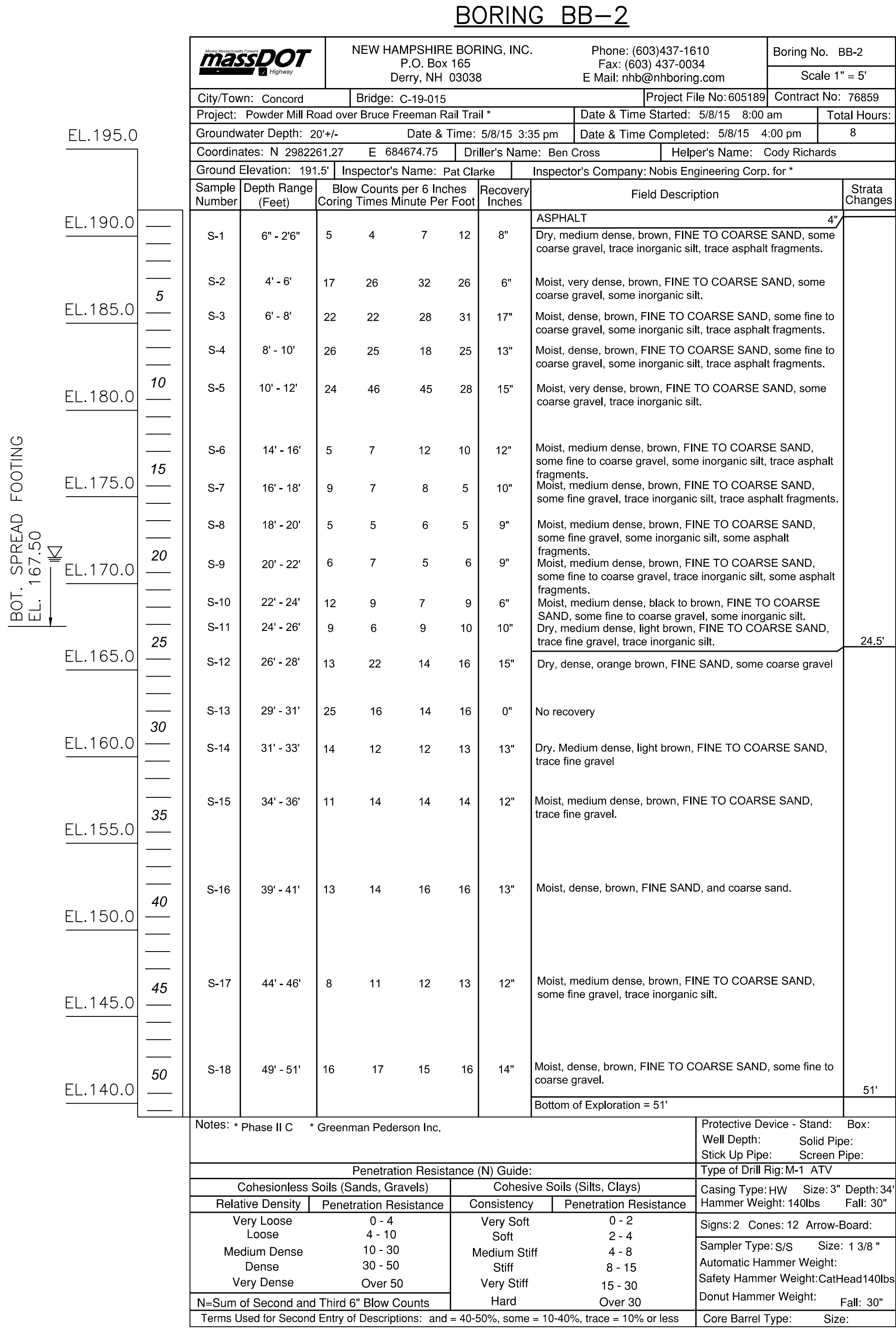
GROUND WATER:

THE WATER LEVELS RECORDED IN THE TABLE ARE THOSE MEASURED ON THE DATES GIVEN AND DO NOT NECESSARILY REPRESENT GROUND WATER LEVEL AT TIME OF CONSTRUCTION

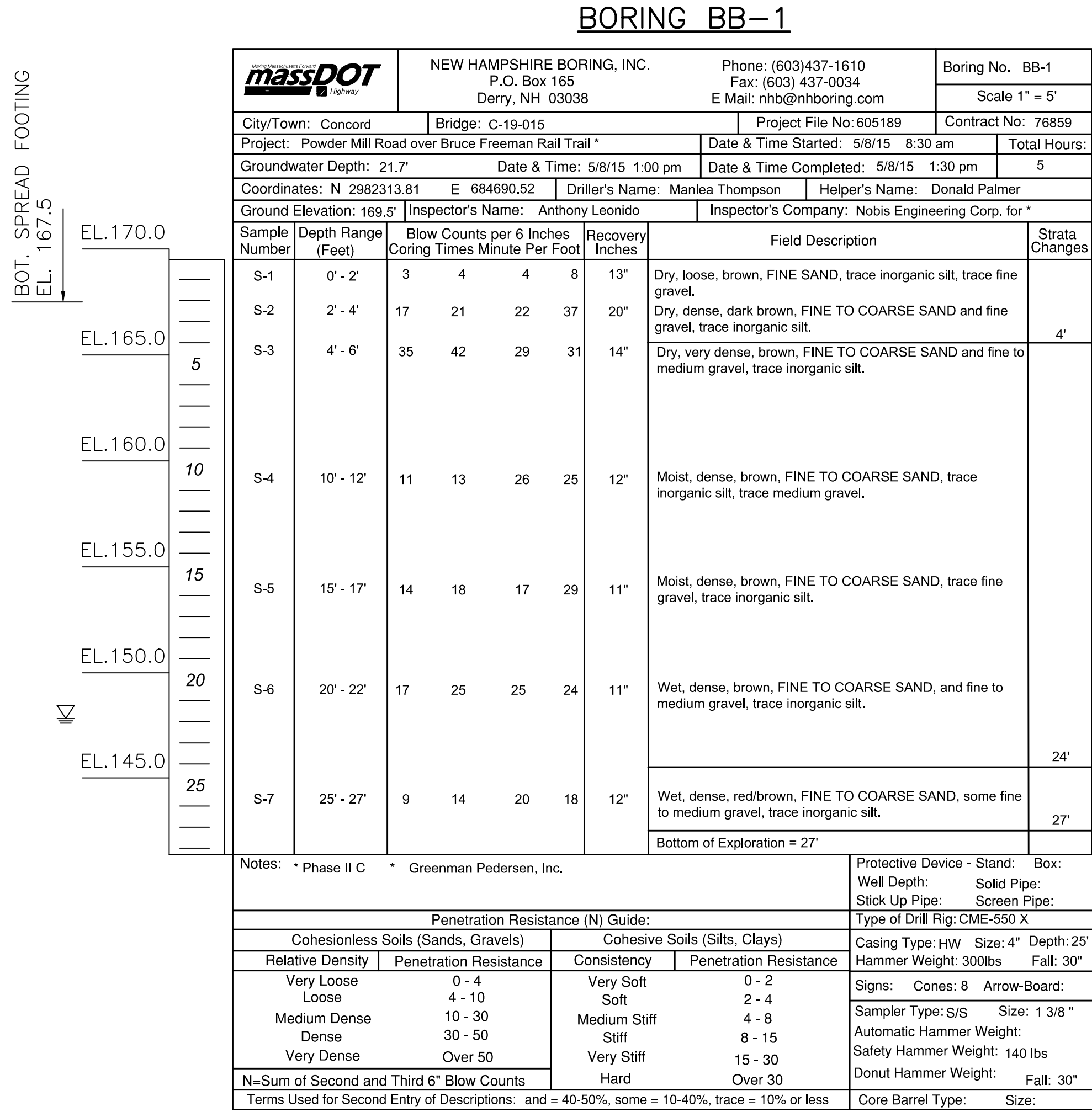
MONTH DD, YYYY		ISSUED FOR CONSTRUCTION
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STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-----	261	328
PROJECT FILE NO. 605189			

BORING LOGS (2 OF 2)



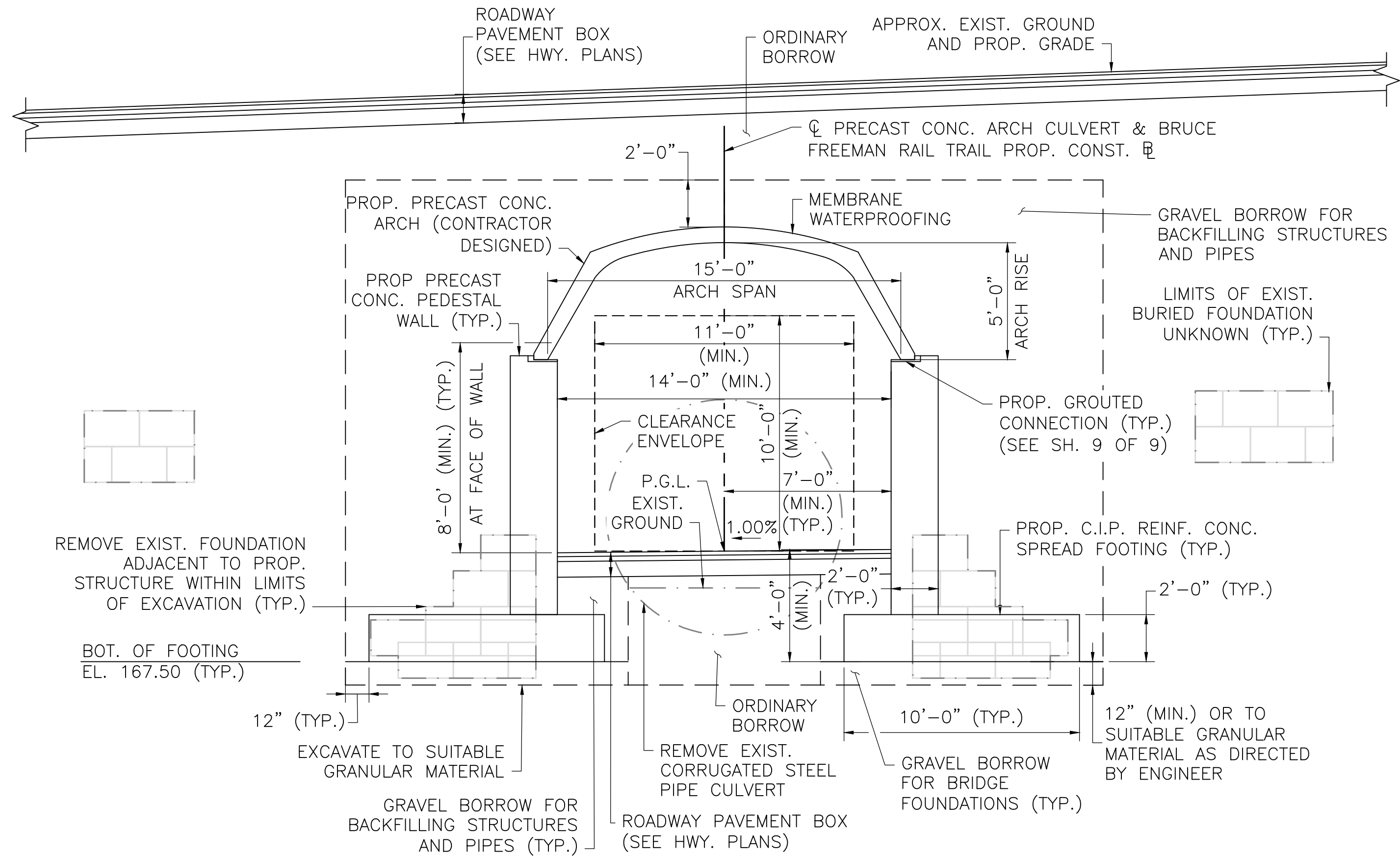
NOTE:
FOR BORING NOTES, SEE SHEET 3



MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
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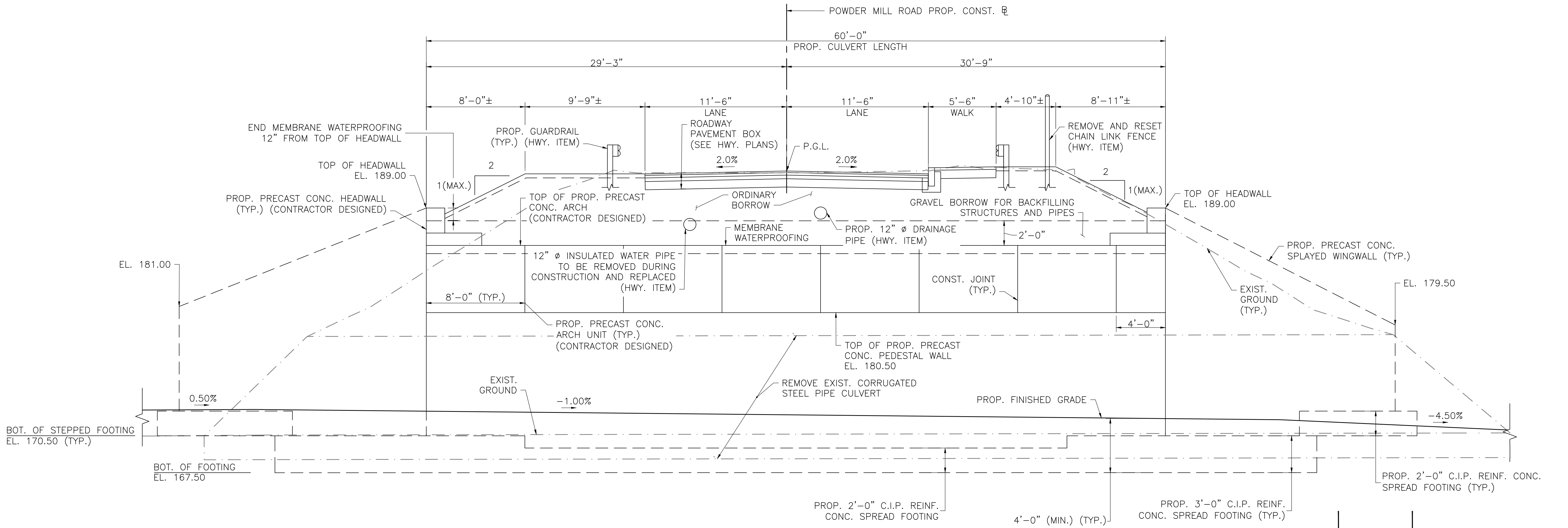
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-----	262	328
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CULVERT SECTIONS



CULVERT CROSS SECTION (LOOKING UP STATION)

SCALE: 1/4" = 1'-0"



CULVERT LONGITUDINAL SECTION

SCALE: 1/4" = 1'-0"

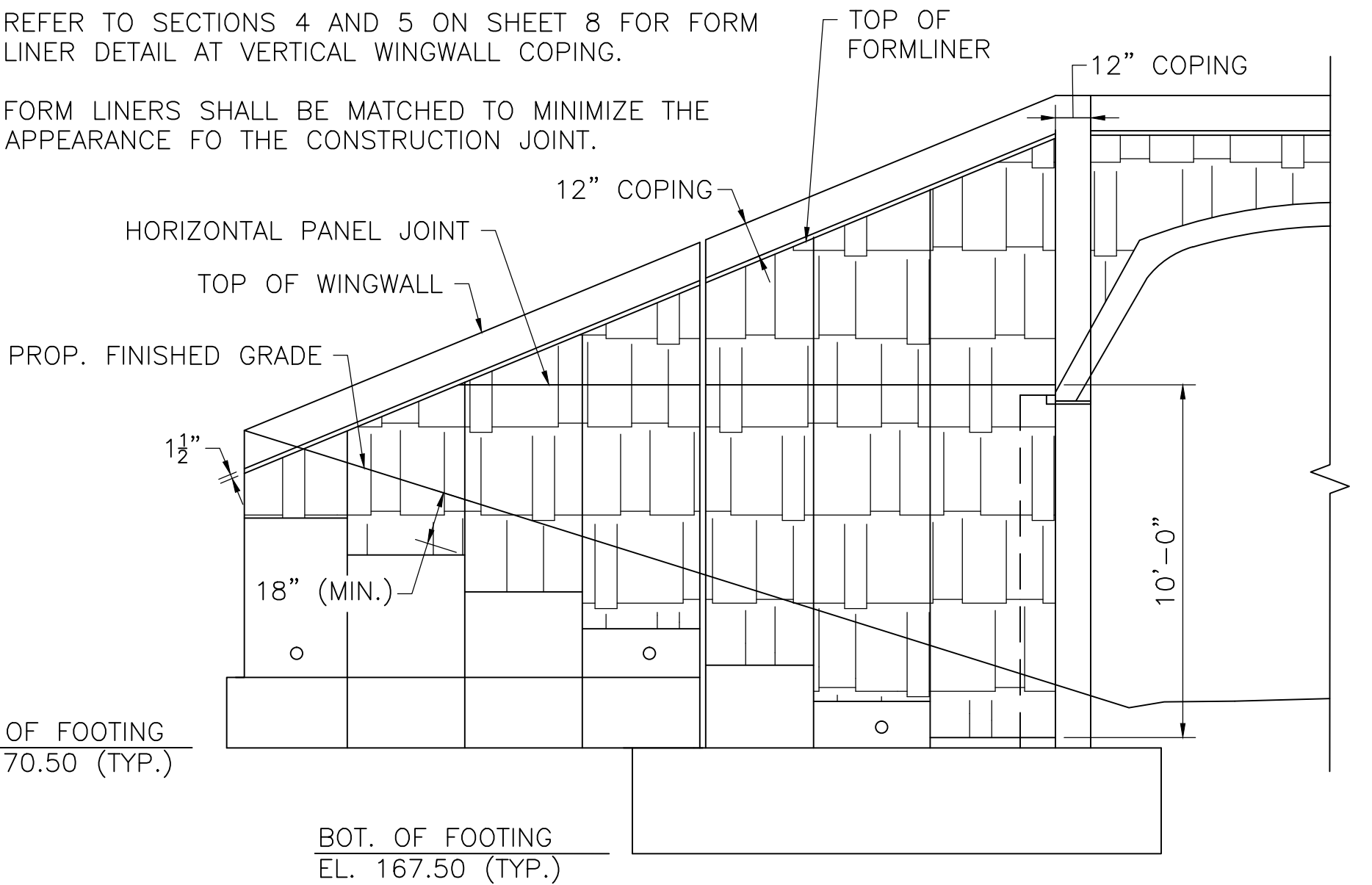
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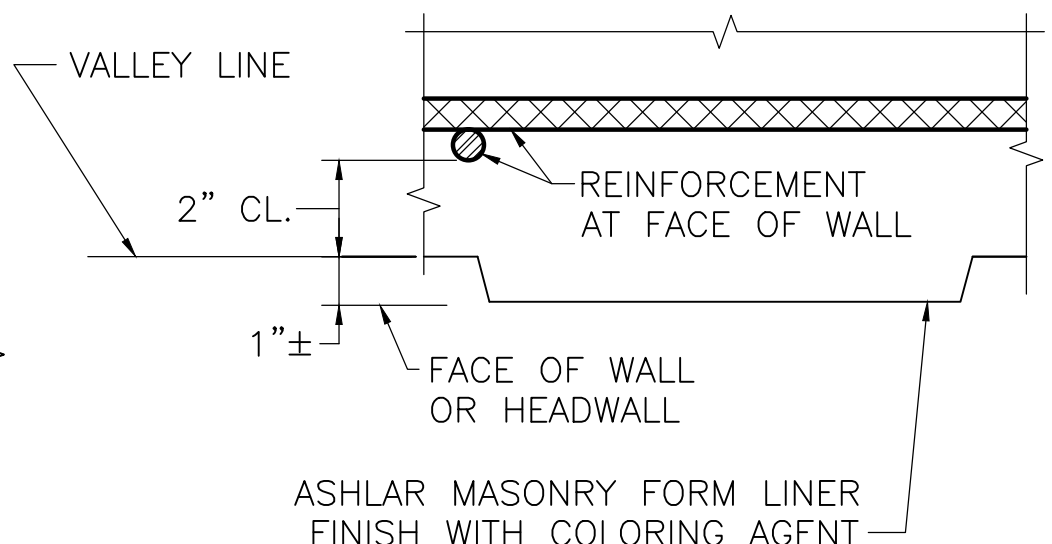
CULVERT ELEVATIONS &
FORMLINER DETAILS

FORM LINER NOTES:

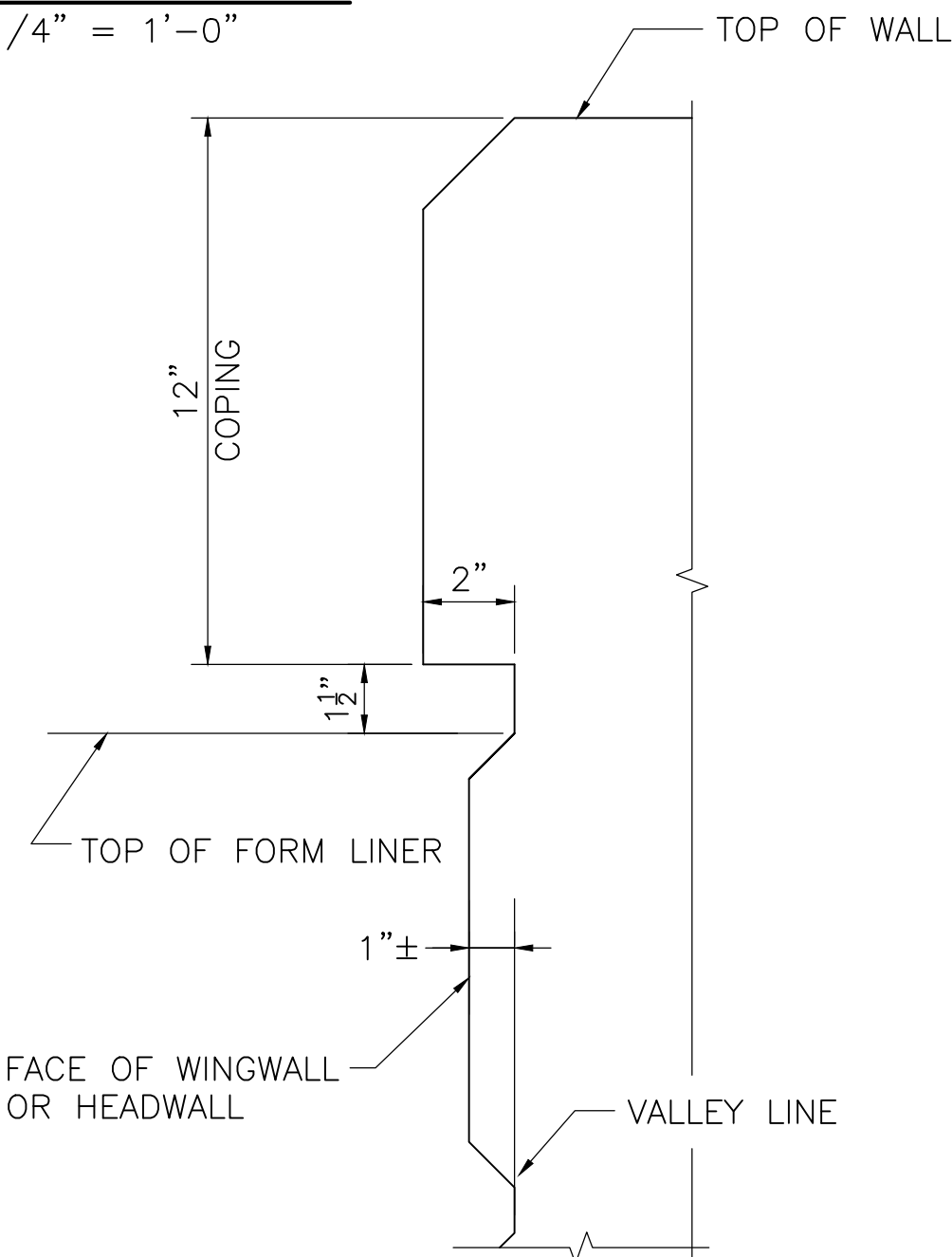
- FACE OF WINGWALLS AND HEADWALLS TO RECEIVE CONCRETE FORMLINER GREENSTREAK PATTERN NO. 328, DRYSTACK RANDOM STONE, SYMONS FORMLINER, ROUGH ASHLAR STONE, AS PRODUCED BY DAYTON SUPERIOR, FITZGERALD FORMLINERS, PATTERN NO. 16984, AGED MARYLAND ASHLAR.
- FORM LINERS SHALL BE PLACED SUCH THAT THERE NO VISIBLE HORIZONTAL OR VERTICAL FORM LINER JOINTS, EXCEPT AT THE CONSTRUCTION JOINTS.
- HORIZONTAL PANEL JOINTS SHALL BE LEVEL.
- REFER TO SECTIONS 4 AND 5 ON SHEET 8 FOR FORM LINER DETAIL AT VERTICAL WINGWALL COPING.
- FORM LINERS SHALL BE MATCHED TO MINIMIZE THE APPEARANCE FO THE CONSTRUCTION JOINT.



FORM LINER ELEVATION
SCALE: 1/4" = 1'-0"



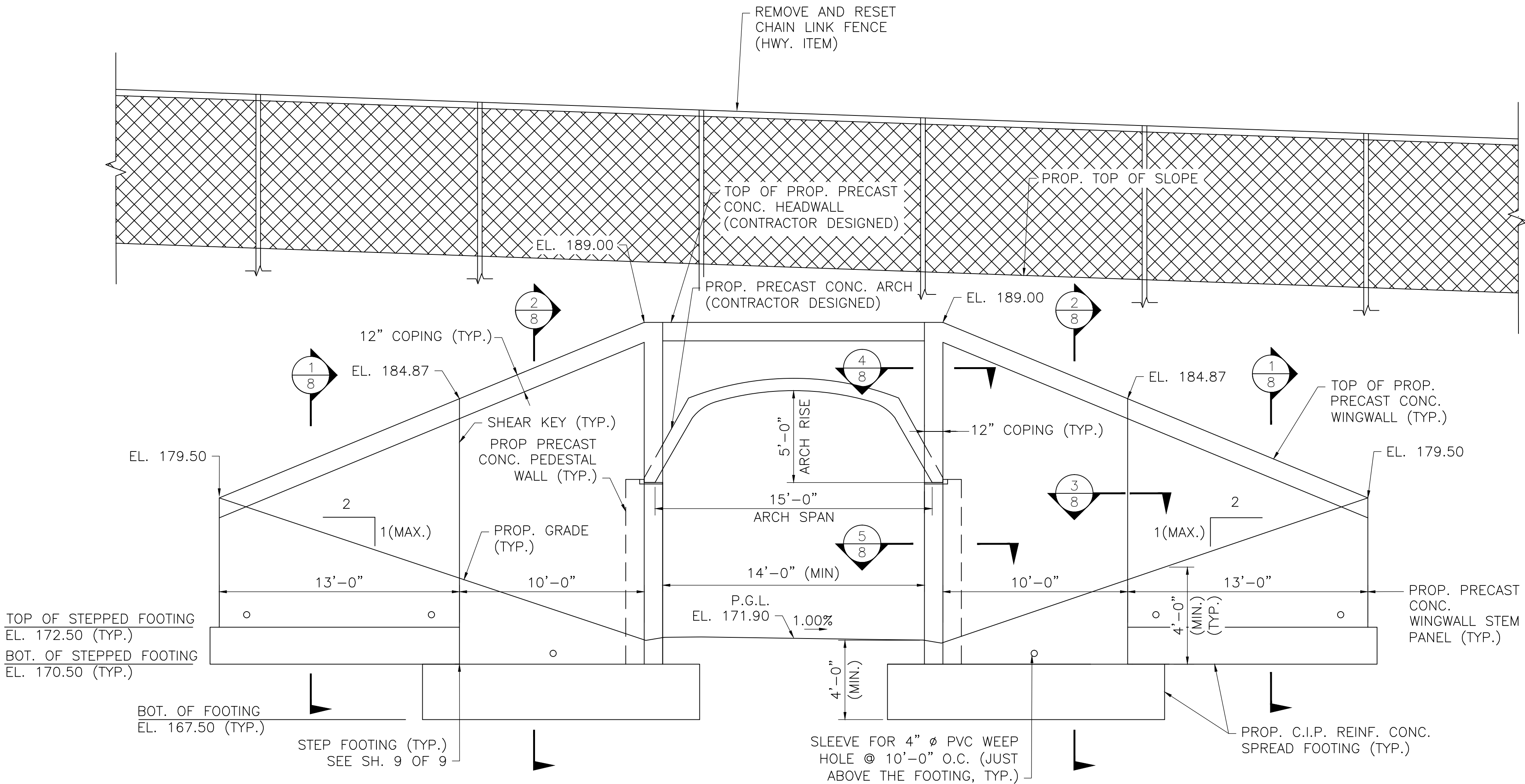
TYPICAL FORM LINER DETAIL
SCALE: 3" = 1'-0"



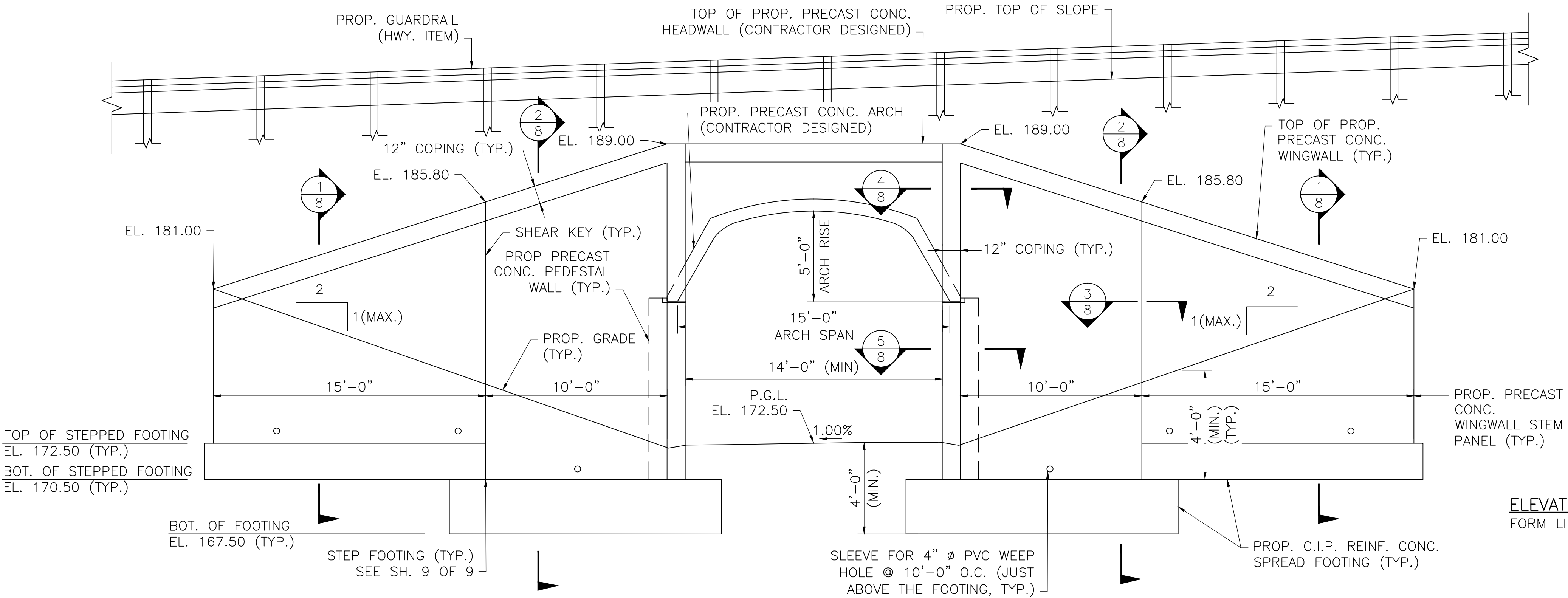
FORM LINER DETAIL AT
TOP OF WALL
SCALE: 3" = 1'-0"

ELEVATION NOTE:
FORM LINER NOT SHOWN FOR CLARITY

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
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DEVELOPED NORTH ELEVATION
SCALE: 1/4" = 1'-0"



DEVELOPED SOUTH ELEVATION
SCALE: 1/4" = 1'-0"

Technical drawing showing a cross-section of a wall and footing assembly. The drawing includes the following components and dimensions:

- Dimensions:**
 - Overall width: 10'-0"
 - Overall height: 2'-0"
 - Top section width: 2'-0"
 - Top section height: 9"
 - Top section offset: 3"
 - Top section chamfer: 2" CHAMFER
 - Top section reinforcement: #6 @ 12"
 - Top section reinforcement: #5 @ 12" (TYP.)
 - Top section reinforcement: #9 @ 12"
 - Top section reinforcement: SEE NOTE 2
 - Top section reinforcement: 2'-0"
 - Top section reinforcement: 14" ± 3/4" SHIM
 - Top section reinforcement: 1 C.Y. CRUSHED STONE (TYP.)
 - Top section reinforcement: SEE NOTE 1
 - Top section reinforcement: #7 @ 6"
 - Top section reinforcement: #5 @ 12" (TYP.)
 - Top section reinforcement: 3" CL. (TYP.)
 - Top section reinforcement: 12"
 - Top section reinforcement: 19"
 - Top section reinforcement: CAST-IN-PLACE CONC. PEDESTAL WALL FOOTING
- Components:**
 - PRECAST CONC. PEDESTAL WALL
 - 2" CL. (TYP.)
 - 2" CHAMFER
 - SEE NOTE 2
 - 2'-0"
 - 14" ± 3/4" SHIM
 - 1 C.Y. CRUSHED STONE (TYP.)
 - SEE NOTE 1
 - #7 @ 6"
 - #5 @ 12" (TYP.)
 - 3" CL. (TYP.)
 - 12"
 - 19"
 - CAST-IN-PLACE CONC. PEDESTAL WALL FOOTING
 - GRouted SPLICE COUPLER (TYP.)
 - NON-SHRINK GROUT

Technical drawing of a retaining wall cross-section, showing precast concrete wingwall and cast-in-place concrete wingwall footing. The drawing includes various dimensions, reinforcement details, and material specifications.

Dimensions:

- Overall height: 14'-0"
- Overall width: 9'-6"
- Top width: 2'-6"
- Bottom width: 14'-0"
- Vertical dimensions on the left: 2'-0", 3'-0", 19", 10"
- Horizontal dimensions on the right: 12" (coping), 1" (cap overhang), 2'-0"
- Minimum depth: 4'-0" (MIN.)

Reinforcement Details:

- #9 @ 12" (typical)
- #5 @ 12" (typical)
- #8 @ 6" (typical)
- #6 @ 12" (typical)
- 1 C.Y. CRUSHED STONE (TYP.)
- 1 1/4" ± 3/4" SHIM

Materials and Finishes:

- PRECAST CONC. WINGWALL
- CAST-IN-PLACE CONC. WINGWALL FOOTING
- FORM LINER FINISH
- 2" CHAMFER (TYP.)
- 12" COPING
- 1" CAP OVERHANG
- 2" CL. TO VALLEY
- 2" CL. (TYP.)
- 3" CL. (TYP.)
- 19"
- 10"

Notes and Slopes:

- SEE NOTE 1
- SEE NOTE 2
- PROP. SLOPE (VARIES)
- NON-SHRINK GROUT
- GROUTED SPLICE COUPLER (TYP.)

Other Labels:

- BITUMINOUS DAMP-PROOFING
- WITH CR
- PROP. SLOPE

Technical drawing of a wingwall cross-section. The drawing shows a precast concrete wingwall on a cast-in-place concrete footing. The wingwall has a vertical height of 8'-6" and a width of 12'-6". The footing has a width of 12'-6" and a height of 4'-0" (MIN.). The wingwall is reinforced with #7 bars at 12" intervals. The footing is reinforced with #5 bars at 12" intervals. The wingwall has a 2" chamfer (typ.) and a 12" coping. The footing has a 2" cl. (typ.) and a 2" cl. valley. The wingwall is finished with a form liner finish. The footing is finished with a non-shrink grout. The drawing includes various dimensions and notes, such as "SEE NOTE 1", "SEE NOTE 2", and "PROP. SLOPE (VARIES)".

Labels and dimensions include:

- PROP. SLOPE
- 2" CHAMFER (TYP.)
- 12" COPING
- 2'-0"
- 1" CAP OVERHANG
- 2" CL. TO VALLEY
- #5 @ 12"
- #5 @ 12" (TYP.)
- FORM LINER FINISH
- SEE NOTE 2
- 1 1/4" ± 3/4" SHIM
- PROP. SLOPE (VARIES)
- GROUTED SPLICE COUPLER (TYP.)
- 2'-0"
- NON-SHRINK GROUT
- 4'-0" (MIN.)
- CAST-IN-PLACE CONC. WINGWALL FOOTING
- 10"
- 14"
- 12'-6"
- 3" CL. (TYP.)
- #5 @ 12" (TYP.)
- #8 @ 6"
- SEE NOTE 1
- 1 C.Y. CRUSHED STONE (TYP.)
- 2" CL. (TYP.)
- PRECAST CONC. WINGWALL
- 8'-6"
- #7 @ 12"
- BITUMINOUS DAMP-PROOFING
- 2'-0"
- 2'-0"

A cross-sectional diagram of a wingwall joint. The diagram shows two vertical wall sections separated by a joint. The left wall has a total height of 2'-6" and a width of 1" (TYP.). The right wall has a total height of 2'-0" and a width of 1" (TYP.). The joint is 14" ± 3/4" wide. The joint is filled with non-shrink grout. A 3/4" chamfer is shown on the left wall. A backer rod and neoprene seal are shown at the top of the joint. The back of the wingwall is indicated. The face of the wingwall is indicated. The joint is labeled as a 14" ± 3/4" JOINT.

FILL SHEAR KEY WITH NON-SHRINK GROUT

BACKER ROD AND NEOPRENE SEAL

BACK OF WINGWALL

2'-6"

1" (TYP.)

3/4" CHAMFER (TYP.)

FACE OF WINGWALL

2'-0"

1" (TYP.)

14" ± 3/4" JOINT

MEMBRANE WATERPROOFING (12"x12")

NEOPRENE SEAL

NON-SHRINK GROUT

FACE OF PEDESTAL WALL

VALLEY LINE

FACE OF WINGWALL WITH FORM LINER FINISH

5 @ 12" (TYP.)

9 @ 12" BACK FACE

5 @ 12" FRONT FACE

2"

1 1/2" GAP TO EDGE OF FORM LINER

20 1/2"

1" + 3/8" GAP

3'-0"

NOTE:

MEMBRANE WATERPROOFING (12"x12")

NEOPRENE SEAL

NON-SHRINK GROUT

1" ± 3/4" GAP

2'-0"

20 1/2"

FACE OF HEADWALL WITH FORM LINER FINISH

FACE OF WINGWALL WITH FORM LINER FINISH

VALLEY LINE

BACK FACE

FRONT FACE

9 @ 12"

5 @ 12" (TYP.)

1 1/2" GAP TO EDGE OF FORM LINER

2"

NOTE:
HEADWALL REINFORCEMENT IS CONTRACTOR DESIGNED.

SECTION 4
SCALE: 1" = 1'-0"

Diagram illustrating the joint details of a pedestal wall. The diagram shows a cross-section of a wall with a joint. Key components and dimensions are labeled:

- BACKER ROD AND NEOPRENE SEAL**: Located at the top of the joint.
- FILL SHEAR KEY WITH NON-SHRINK GROUT**: Located at the top of the joint.
- BACK OF PEDESTAL WALL**: The rear face of the wall.
- FACE OF PEDESTAL WALL**: The front face of the wall.
- 1" (TYP.)**: Dimension for the width of the joint opening.
- 2'-0"**: Overall height of the wall section shown.
- 3/4" CHAMFER (TYP.)**: Dimension for the chamfer at the bottom of the joint.
- 1" (TYP.)**: Dimension for the width of the joint opening at the bottom.
- 1/4" ± 3/4" JOINT**: Dimension for the joint width at the bottom.

VARIES

6'-0"

2'-0"

2'-0"

3'-0"

1'-3" CL.

3" CL.

EL. 167.50

WINGWALL FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY

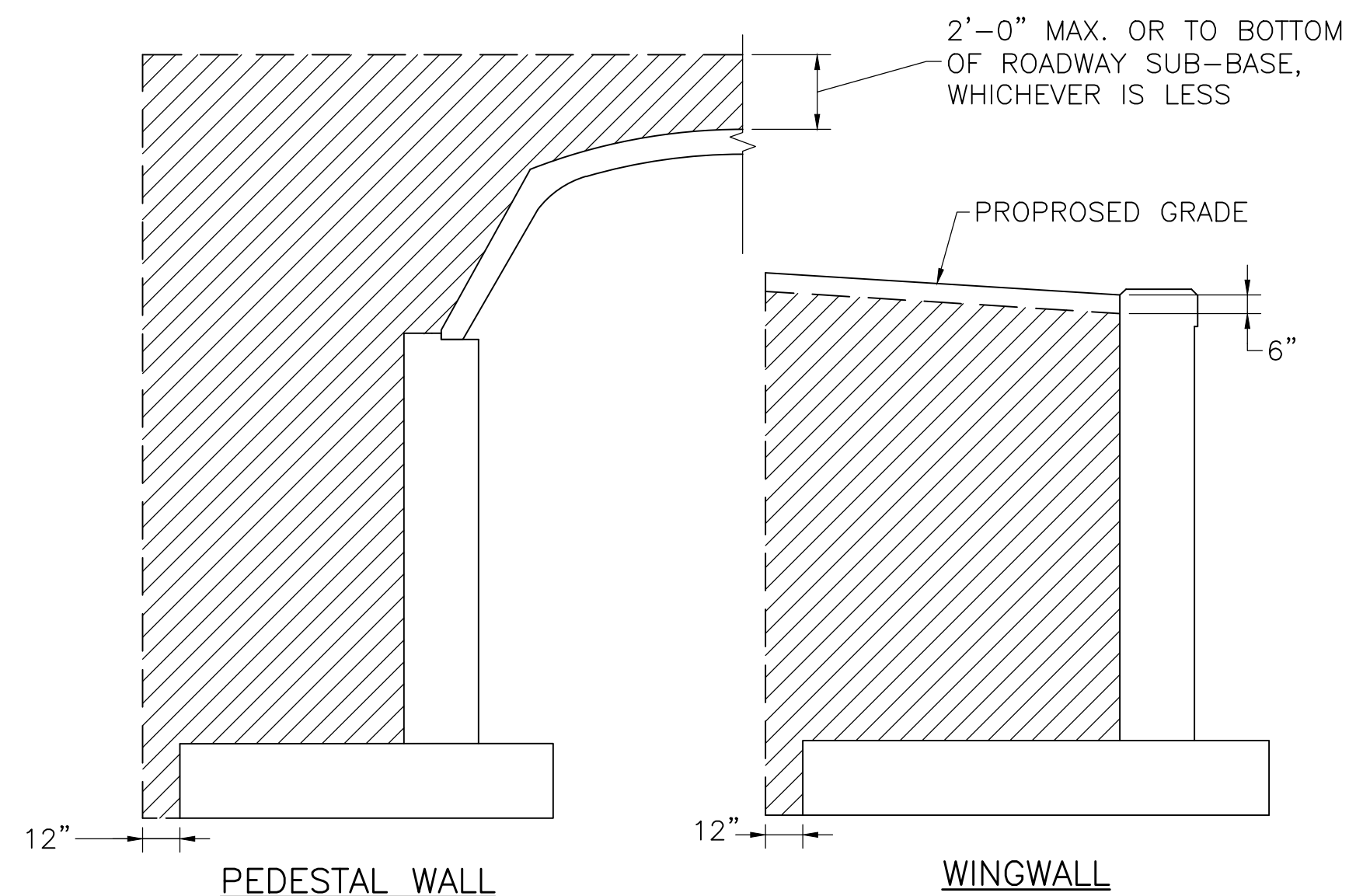
CAST-IN-PLACE CONC. FOOTING

NOTE:
SEE SECTION 7 FOR
REINFORCING DETAILS

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	----	266	328
PROJECT FILE NO. 605189			

MISCELLANEOUS DETAILS

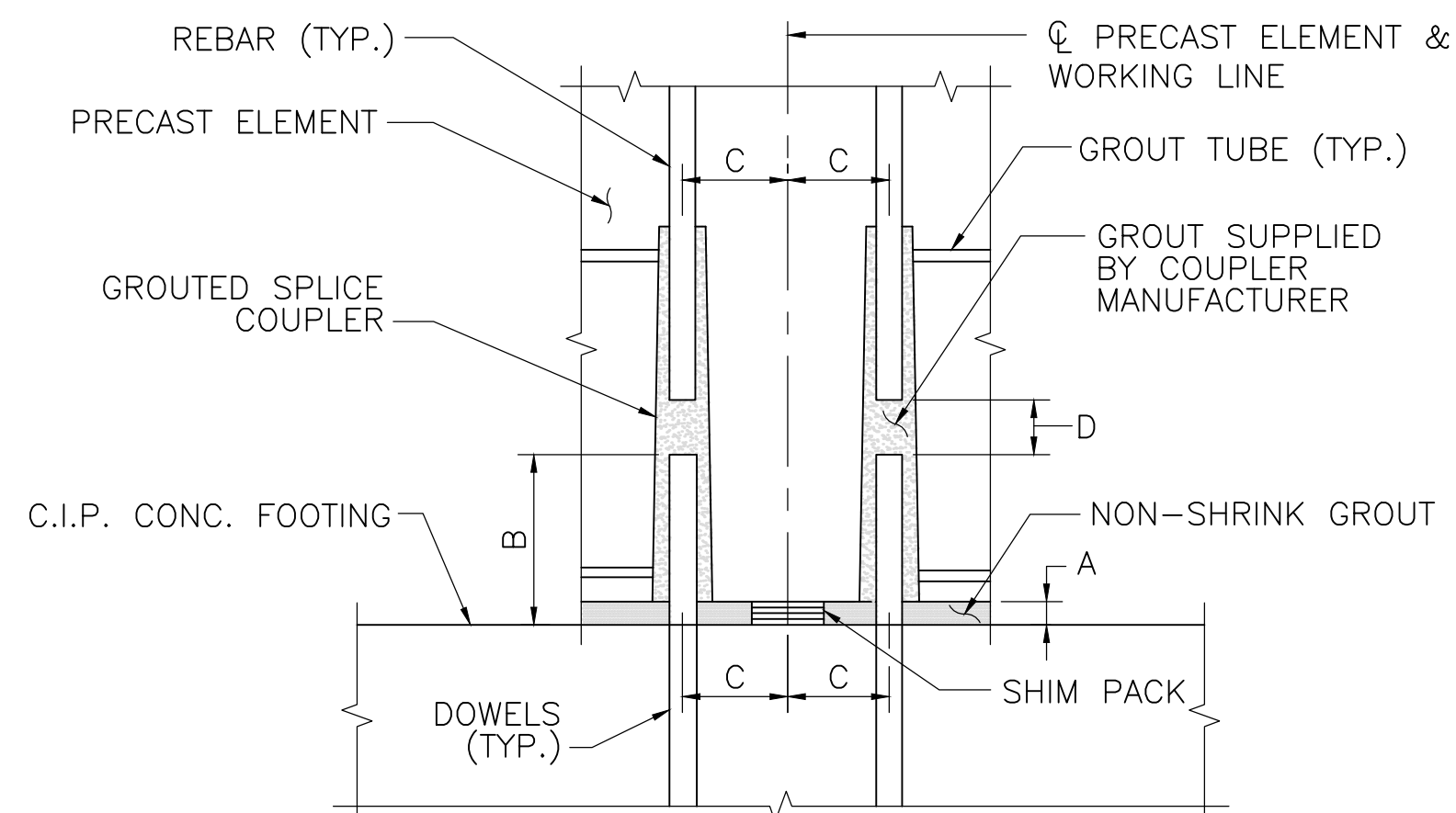


NOTE:

HATCHED AREA INDICATES LIMITS OF GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES.

LIMITS OF GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES

SCALE: $\frac{1}{4}" = 1'-0"$



NOTES:

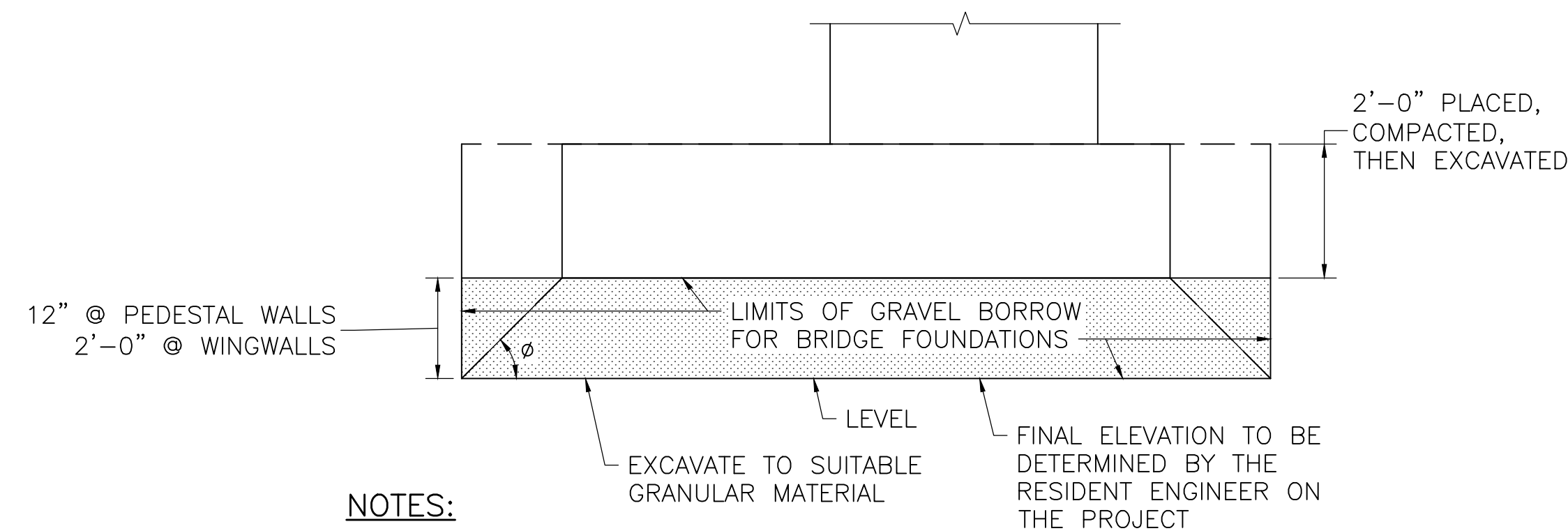
1. USE MATCHING TEMPLATES FOR THE LOCATION OF REINFORCEMENT AND GROUDED SPLICE COUPLER PLACEMENT WITHIN THE ELEMENTS TO CONTROL THE CRITICAL DIMENSION "C".
2. CONSULT MANUFACTURER OF THE GROUDED SPLICE COUPLER FOR PROPER DIMENSIONS "B" AND "D" AND FOR TOLERANCES ON THESE AND ALL DIMENSIONS.
3. BEFORE EXECUTING GROUDED SPLICE COUPLER ASSEMBLIES, ALWAYS SEEK INSTALLATION RECOMMENDATIONS FROM THE MANUFACTURER OF THE GROUDED SPLICE COUPLER USED.

GROUTED SPLICE COUPLER DETAILS

NOT TO SCALE

GROUTED SPLICE COUPLER TOLERANCES

A	SHIM PACK HEIGHT	$1\frac{1}{4}" \pm \frac{3}{4}"$
B	DOWEL HEIGHT	CONSULT MANUFACTURER
C	LOCATION OF REINFORCING, GROUTED SPLICE COUPLER, AND DOWELS MEASURED FROM A WORKING LINE	$\pm \frac{1}{4}"$
D	GAP BETWEEN DOWELS AND REINFORCING	CONSULT MANUFACTURER

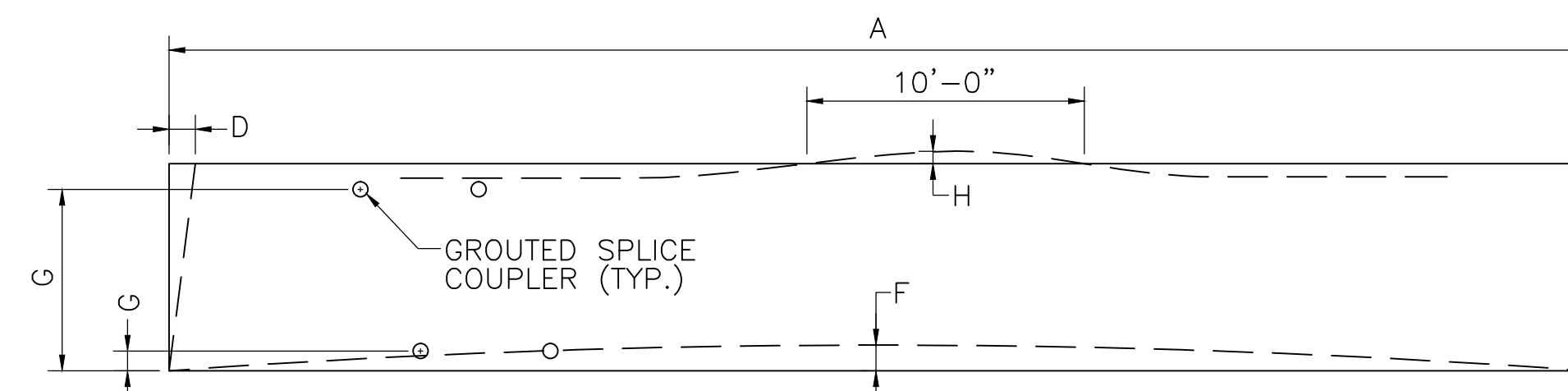


NOTES:

1. $\phi = 45^\circ$ FOR DEPTH OF 5'-0" OR LESS.
 $\phi = 60^\circ$ FOR DEPTH OVER 5'-0".
2. SAME TREATMENT IS TO BE USED AT ENDS OF WALLS.

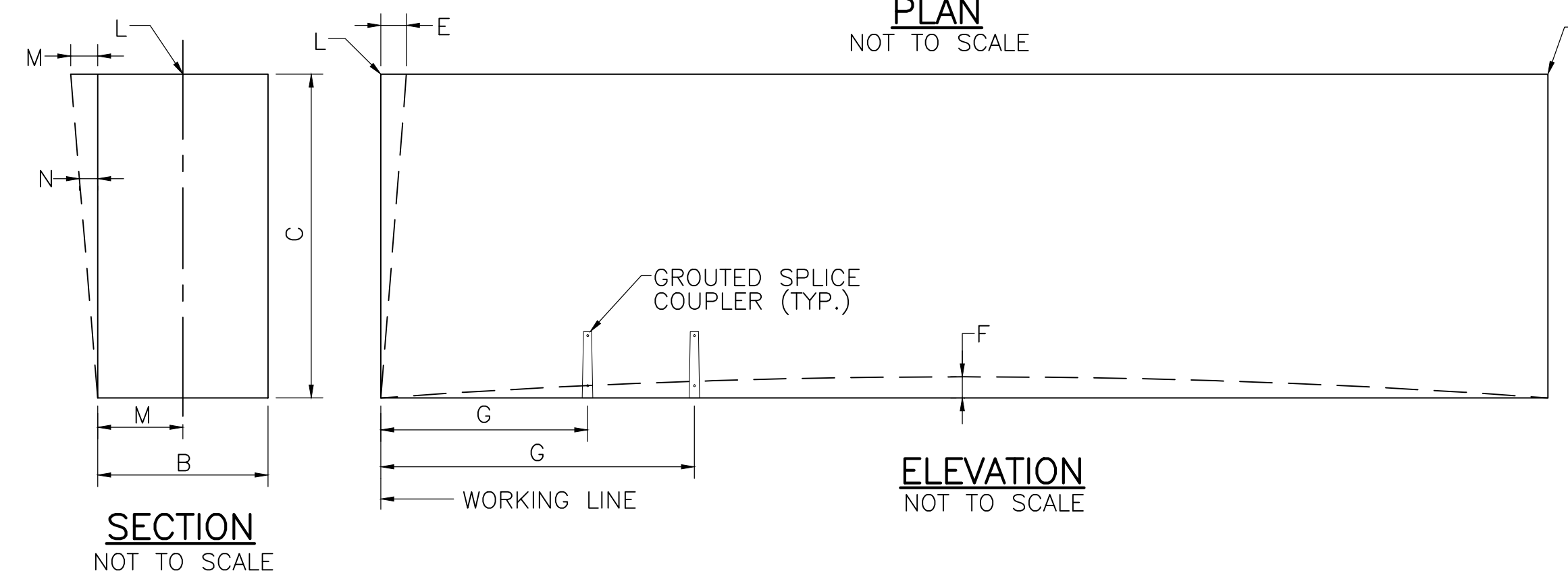
LIMITS OF GRAVEL BORROW FOR BRIDGE FOUNDATIONS

NOT TO SCALE



PLAN

NOT TO SCALE

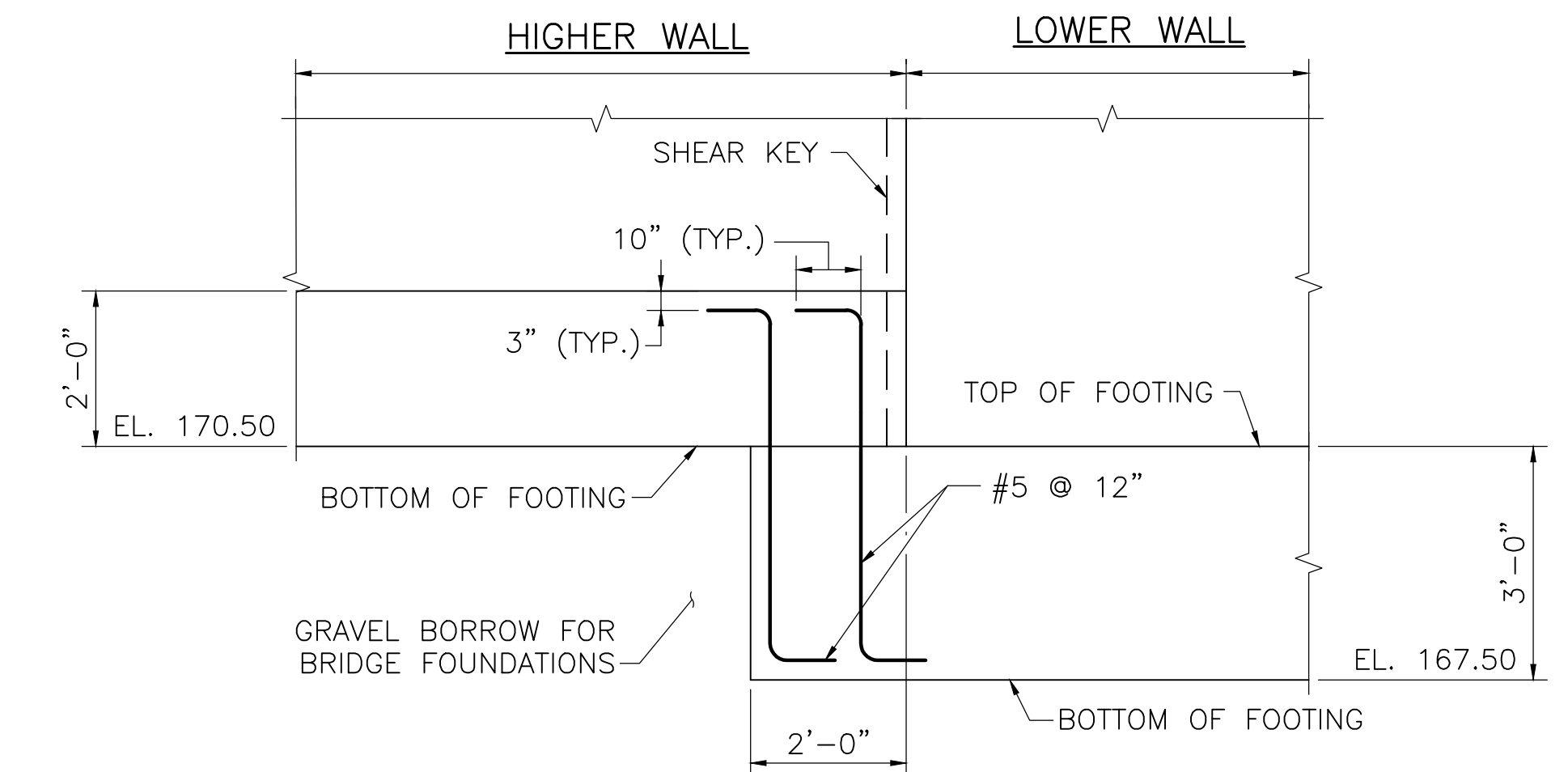


WALL SEGMENT ELEVATION ERECTION TOLERANCES

L	TOP ELEVATION FROM NOMINAL TOP ELEVATION	$\frac{1}{4}$ "
M	MAXIMUM PLUMB VARIATION OVER HEIGHT OF PANEL	$\frac{1}{2}$ "
N	PLUMB IN ANY 10 FEET OF PANEL HEIGHT	$\frac{1}{4}$ "

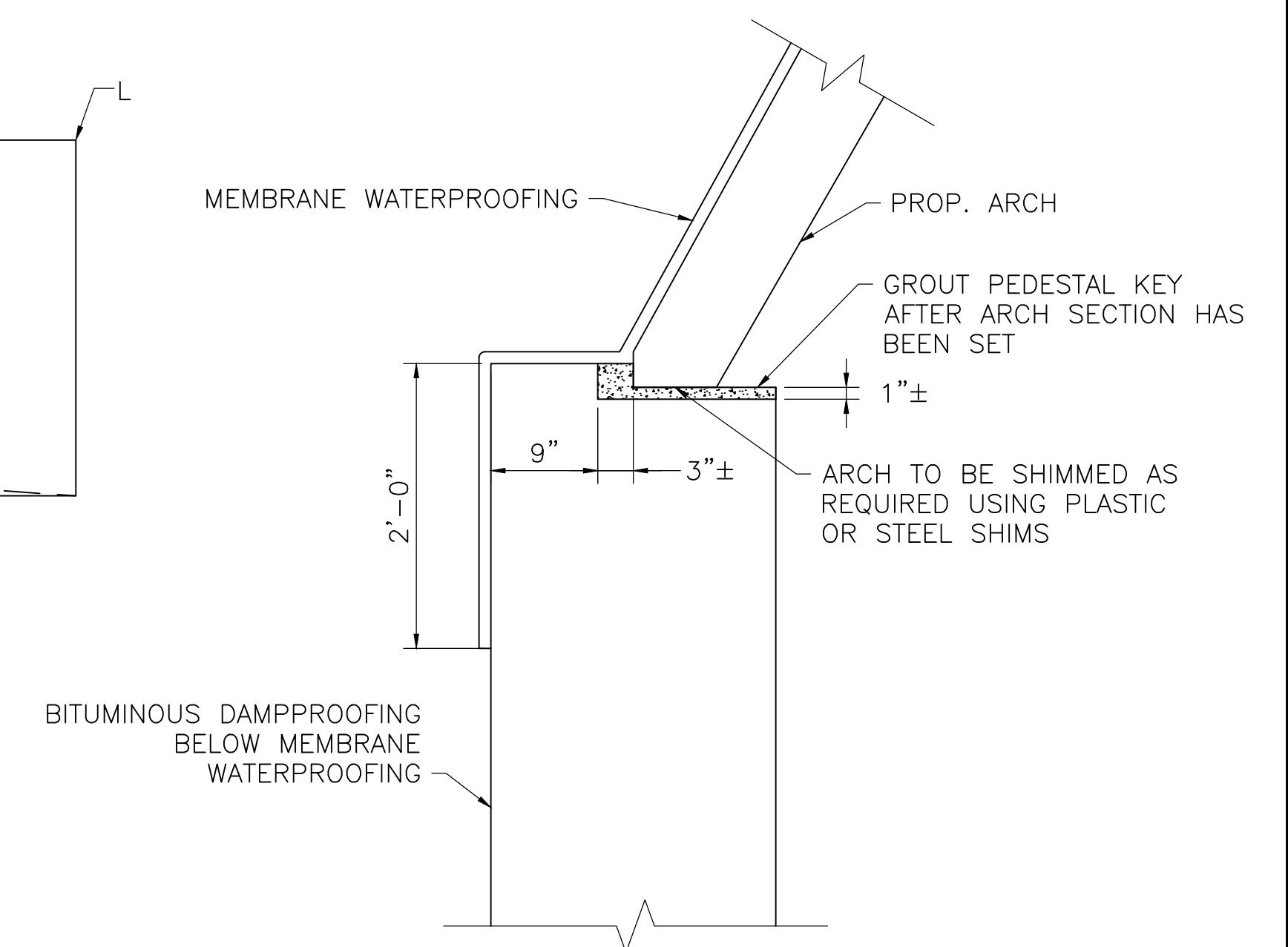
WALL SEGMENT FABRICATION TOLERANCES

A	LENGTH	$\pm \frac{1}{4}$ "
B	WIDTH (OVERALL)	$\pm \frac{1}{4}$ "
C	DEPTH (OVERALL)	$\pm \frac{1}{4}$ "
D	VARIATION FROM SPECIFIED PLAN END SQUARENESS OR SKEW	$\pm \frac{1}{2}$ "
E	VARIATION FROM SPECIFIED ELEVATION END SQUARENESS OR SKEW	$\pm \frac{1}{2}$ "
F	SWEEP OVER MEMBER LENGTH	$\pm \frac{3}{8}$ "
G	LOCATION OF GROUTED SPLICE COUPLER MEASURED FROM A WORKING LINE	$\pm \frac{1}{4}$ "
H	LOCAL SMOOTHNESS OF ANY SURFACE	$\pm \frac{1}{4}$ " IN 10 FEET
J	LOCATION OF BLOCKOUT FOR PILES OR VOIDS	N/A
K	MAXIMUM PLUMB VARIATION OVER HEIGHT OF CMP VOID	N/A



STEPPED-UP FOOTING DETAIL

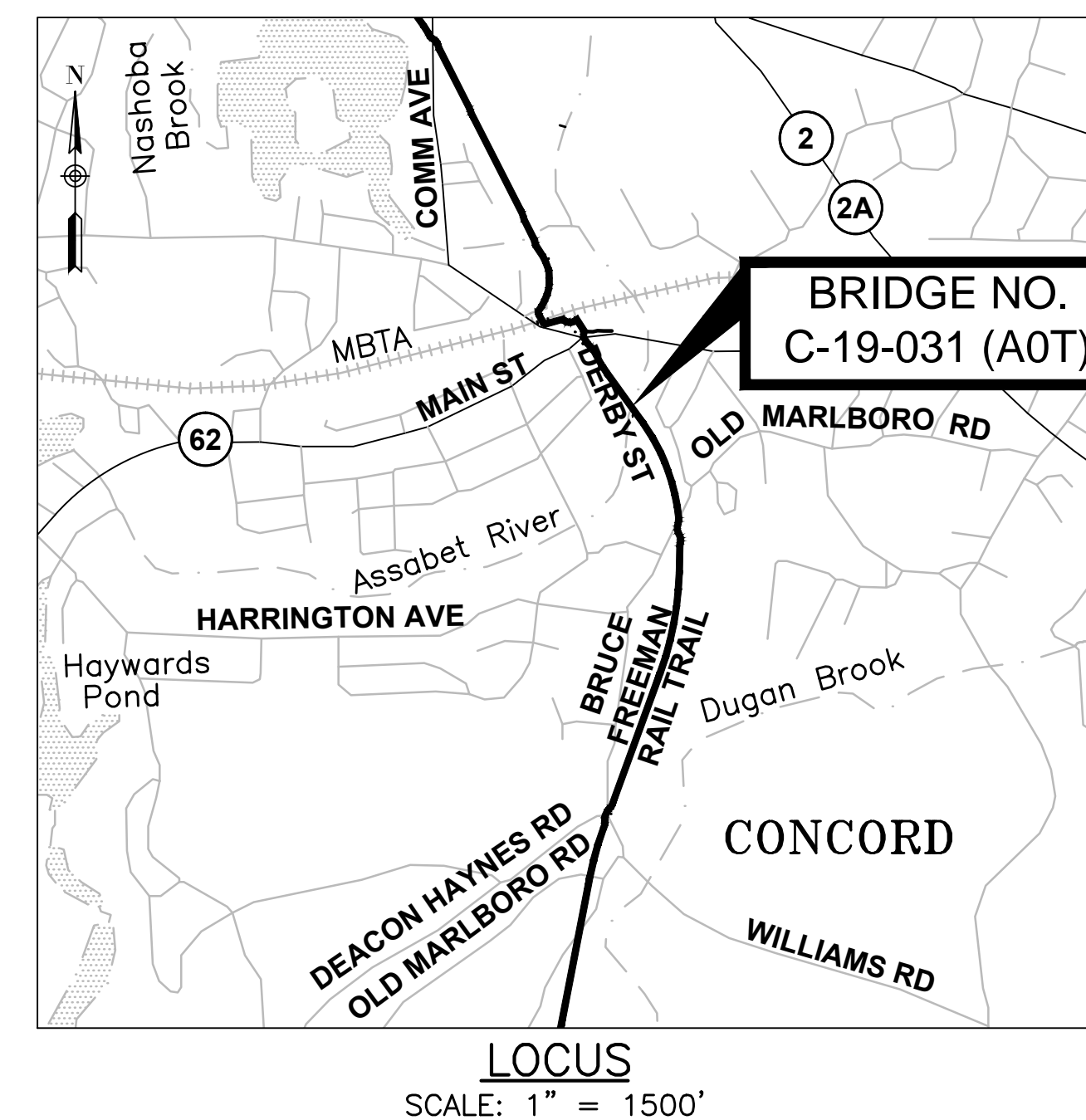
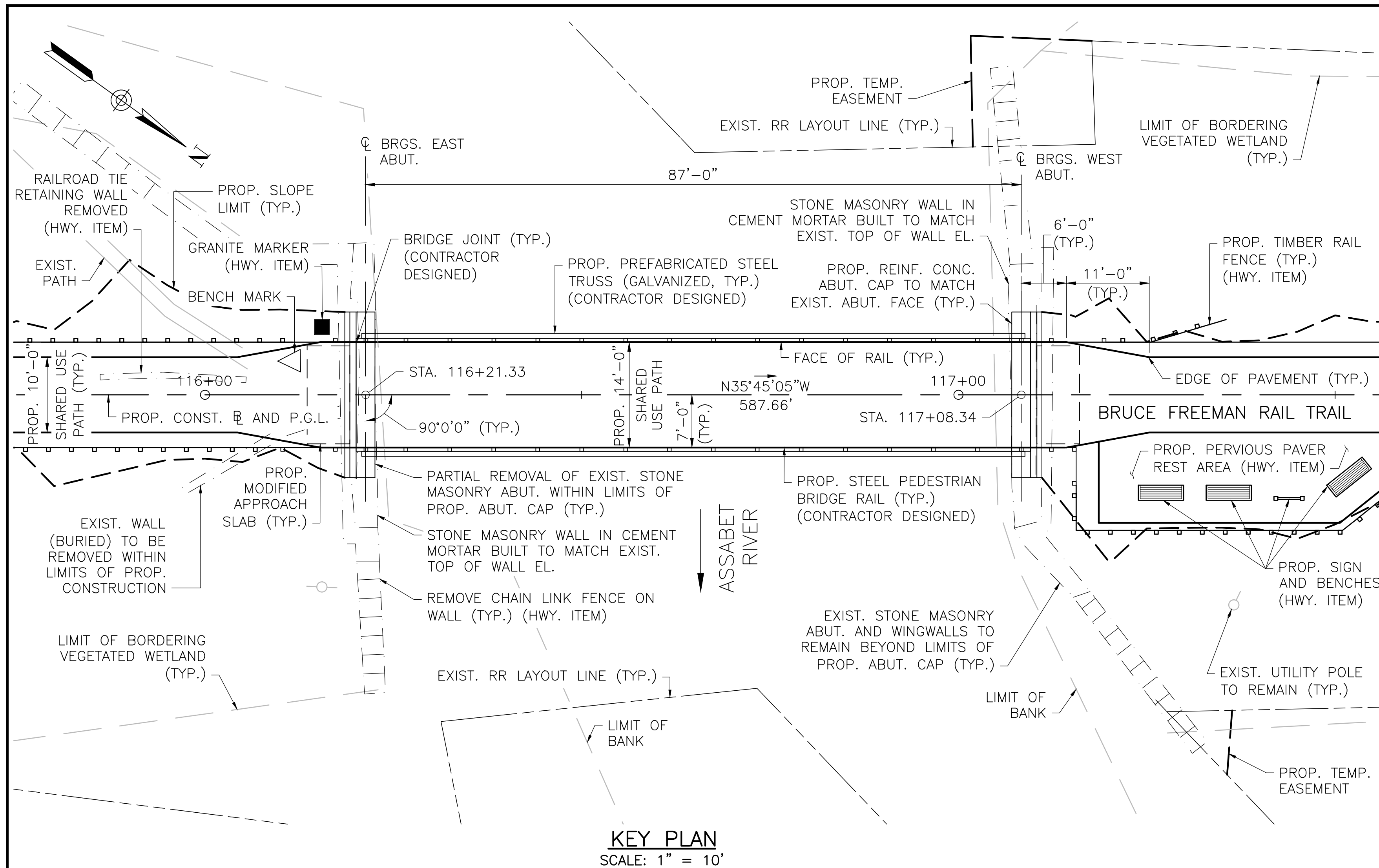
SCALE: $\frac{1}{2}" = 1'-0"$



PEDESTAL WALL GROUT CONNECTION DETAIL

SCALE: 1" = 1'-0"

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	



CONCORD
BRUCE FREEMAN RAIL TRAIL PHASE 2C

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	----	267	328
PROJECT FILE NO. 605189			

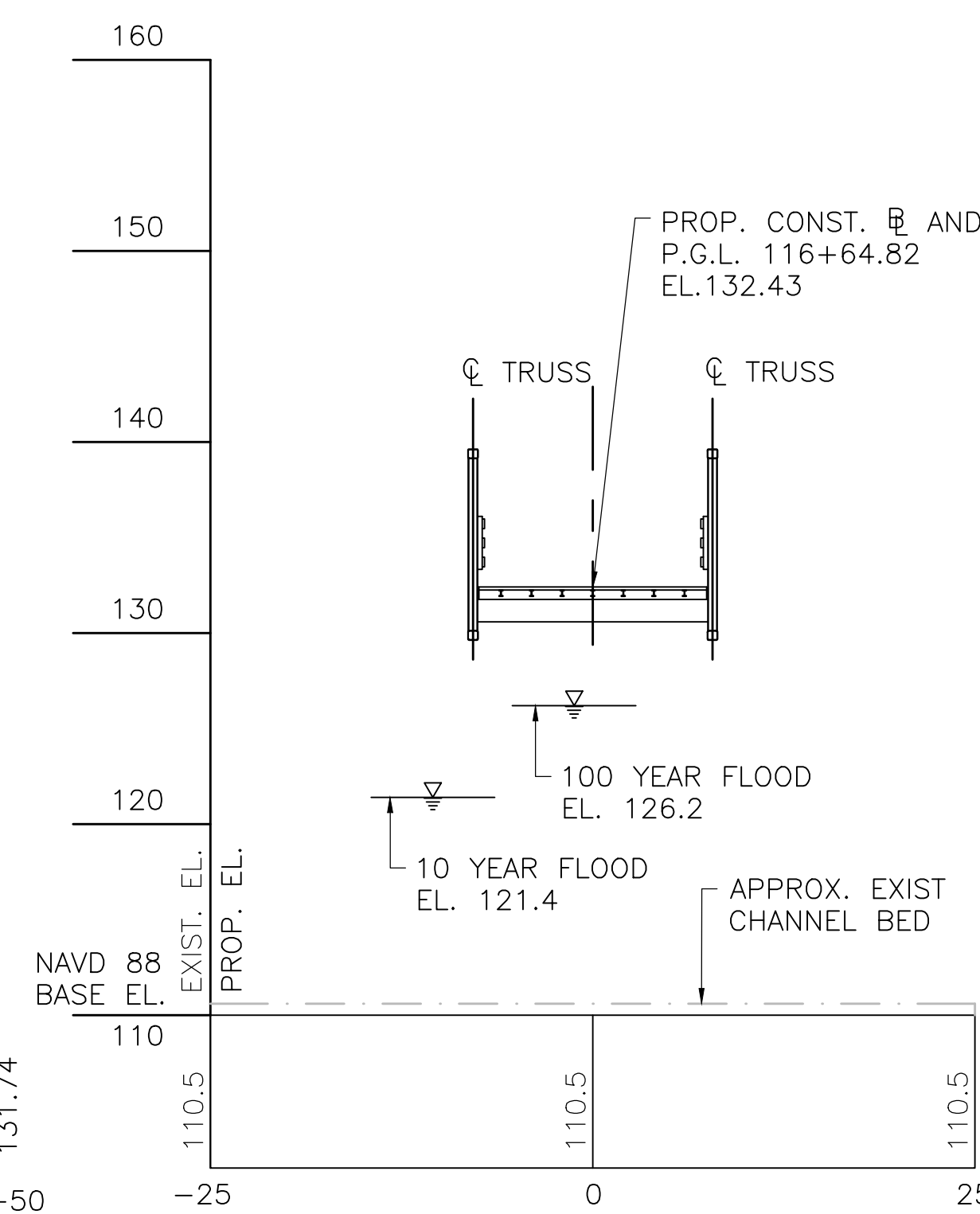
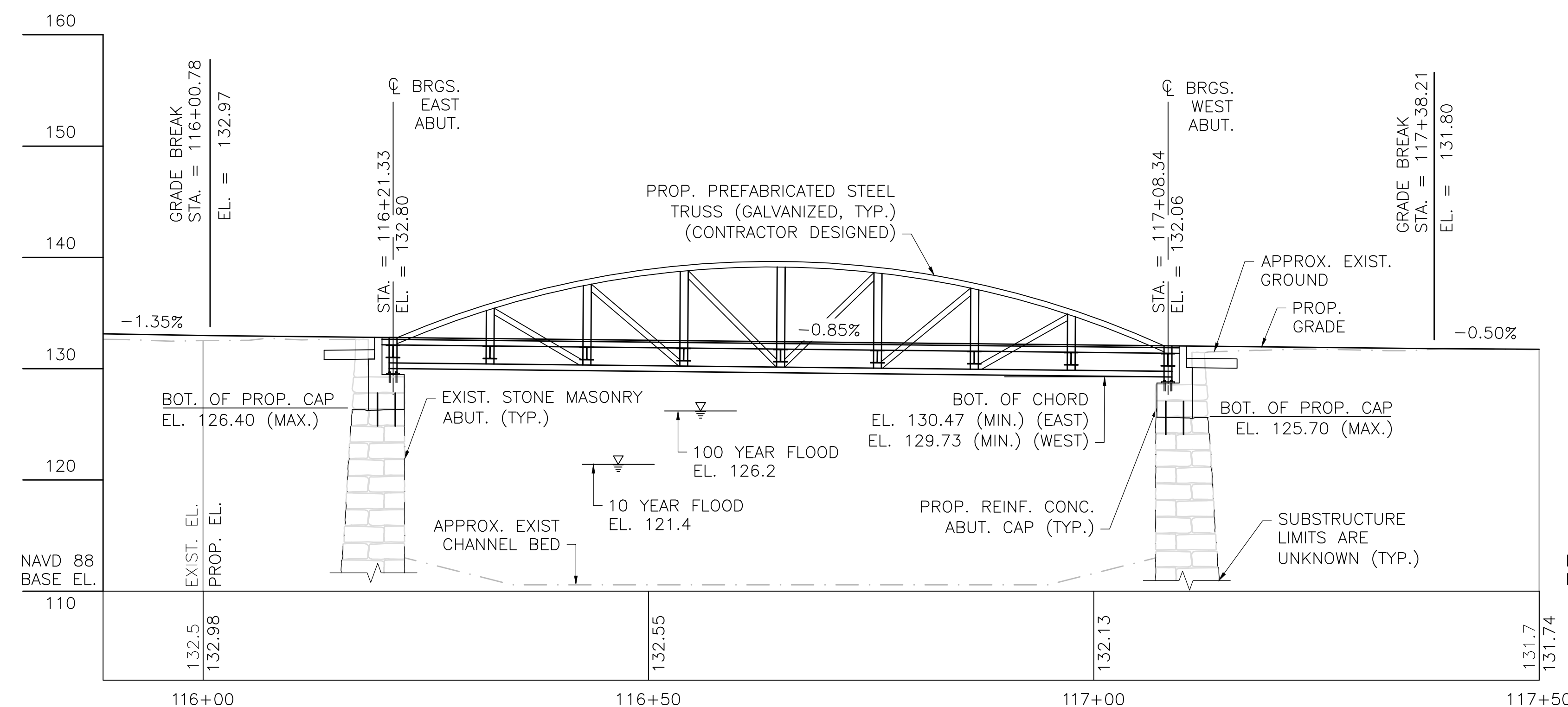
KEY PLAN, LOCUS MAP, AND PROFILES

INDEX OF BRIDGE SHEETS:


1. KEY PLAN, LOCUS MAP, AND PROFILES
2. GENERAL NOTES AND ESTIMATED QUANTITIES
3. ELEVATION AND CROSS SECTION
4. ABUTMENT CAP DETAILS
5. APPROACH SLAB AND MISC. DETAILS

NOTE:

FOR GENERAL NOTES, SEE SHEET 2.



Greenman-Pedersen, Inc.
GPI
181 Ballardvale Street, Suite 202
Wilmington, MA 01887

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
 massDOT Massachusetts Department of Transportation Highway Division	
SUPERSTRUCTURE REPLACEMENT CONCORD BRUCE FREEMAN RAIL TRAIL OVER ASSABET RIVER MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION 10 PARK PLAZA BOSTON, MASS	
TITLE:	CHIEF ENGINEER

GENERAL NOTES

DESIGN:

IN ACCORDANCE WITH THE 2014 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION WITH CURRENT INTERIM SPECIFICATIONS THROUGH 2015 AND THE 2009 AASHTO LRFD GUIDE SPECIFICATIONS FOR THE DESIGN OF PEDESTRIAN BRIDGES, FOR H10 LOADING AND 90 PSF PEDESTRIAN LOADING.

MASSDOT BENCH MARK:

BENCH MARK – REBAR–CAP 80032
N 2990663.04 E 685643.21
STA. 116+11.68 4.52’ LT
EL. 132.17’

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

MASSDOT SURVEY NOTEBOOKS:

COPIES OF ELECTRONIC SURVEY FILES MAY BE OBTAINED FROM THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION – HIGHWAY DIVISION.

SCALES:

SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZED PRINTS. DIVIDE SCALES BY 2 FOR HALF–SIZE PRINTS (A3).

FOUNDATIONS:

FOUNDATIONS MAY BE ALTERED, IF NECESSARY, TO SUIT CONDITIONS ENCOUNTERED DURING CONSTRUCTION, WITH THE APPROVAL OF THE ENGINEER.

UNSUITABLE MATERIAL:

ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATIONS OF THE STRUCTURE, AS DIRECTED BY THE ENGINEER.

SEISMIC GROUND SHAKING HAZARD:

DESIGN RETURN PERIOD: 1000 YEARS

DESIGN SPECTRA:

As = 0.118
Sds = 0.243
SD1 = 0.096

SITE CLASS = D

SEISMIC DESIGN CATEGORY (SDC) = A

ANCHOR BOLTS:

ALL ANCHOR BOLTS SHALL BE SET BY TEMPLATE BEFORE THE CONCRETE IS PLACED.

REINFORCEMENT:

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60 (EPOXY COATED). UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

MODIFICATION CONDITION	#4 BARS	#5 BARS
1. NONE	21"	26"
2. 12" OF CONCRETE BELOW BAR	29"	36"
3. COATED BARS, COVER < 3db, OR CLEAR SPACING < 6db	31"	39"
4. COATED BARS, ALL OTHER CASES	25"	31"
5. CONDITION 2. AND 3.	35"	44"
6. CONDITION 2. AND 4.	34"	43"

IF THE ABOVE BARS ARE SPACED 6" OR MORE ON CENTER, THE LAP LENGTH SHALL BE 80% OF THE LAP LENGTH GIVEN ABOVE. ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.

CONCRETE MIXES:

(1)	(2)	(3)	TO BE USED IN CONSTRUCTION OF:
4000	1½	565	APPROACH SLABS
4000	¾	610	ABUTMENT CAPS AND BACKWALLS

- (1) 28 DAY COMPRESSIVE STRENGTH (PSI)
(2) MAXIMUM AGGREGATE SIZE (INCH)
(3) CEMENTITIOUS CONTENT (POUNDS/C.Y.)

CONTRACTOR DESIGNED SUPERSTRUCTURE:

THE TRUSS BRIDGE CHORDS ARE TO BE FABRICATED OUT OF STEEL I–BEAMS WITH GUSSET PLATES. STRUCTURAL STEEL TRUSS (INCLUDING CAMBER AND TOP OF FORM ELEVATIONS), IPE TIMBER DECK, BEARINGS, ANCHOR BOLTS, STEEL RAILINGS, AND DECK JOINTS SHALL BE CONTRACTOR DESIGNED IN ACCORDANCE WITH THE 2014 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS WITH CURRENT INTERIM SPECIFICATIONS THROUGH 2015 AND THE 2009 AASHTO LRFD GUIDE SPECIFICATIONS FOR THE DESIGN OF PEDESTRIAN BRIDGES, FOR H10 LOADING AND 90 PSF PEDESTRIAN LOADING. STEEL TRUSS SHALL BE GALVANIZED (UNPAINTED) AND STEEL BRIDGE RAIL SHALL BE GALVANIZED AND PAINTED.

THE ABUTMENT BACKWALL DESIGN ASSUMES A TOTAL STEEL TRUSS WEIGHT (INCLUDING IPE DECK) WITHIN A RANGE OF 51 KIPS TO 63 KIPS (SERVICE LOAD). IF THE WEIGHT OF THE CONTRACTOR DESIGNED TRUSS IS NOT WITHIN THE SPECIFIED RANGE, THE BACKWALL DESIGN SHALL BE COMPLETED AND STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE COMMONWEALTH OF MASSACHUSETTS. THE CALCULATIONS PERFORMED SHALL BE SUPPLIED TO THE ENGINEER FOR APPROVAL.

CONSTRUCTION ACCESS RESTRICTION:

THE CONTRACTOR IS DIRECTED TO SUPPLEMENTAL SPECIFICATION SECTION 901.67 FOR RESTRICTIONS OF LOADING ON THE NEWLY CONSTRUCTED BRIDGE AND SECTION 960.61 FOR RESTRICTIONS ON THE REMOVAL OF FALSEWORK DURING ERECTION OF THE TRUSS. ANY LOADING EXCEEDING THE DESIGN LOADING SHALL BE RESTRICTED FROM TRAVELING OVER THE BRIDGE. THE CONTRACTOR MAY ELECT TO SUBMIT CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE COMMONWEALTH OF MASSACHUSETTS TO THE ENGINEER FOR APPROVAL, WHICH DEMONSTRATE THAT CONSTRUCTION LOADS CAN SAFELY TRAVEL OVER THE STRUCTURE.

CONSTRUCTION SURCHARGE RESTRICTION:

DUE TO THE UNKNOWN GEOMETRY OF THE EXISTING SUBSTRUCTURE, THERE SHALL BE NO ADDITIONAL SURCHARGE LOADS APPLIED TO THE SUBSTRUCTURE DURING CONSTRUCTION. THEREFORE, CONSTRUCTION LOADING IS RESTRICTED FROM THE FRONT FACE OF THE EXISTING ABUTMENTS TO A DISTANCE OF 25 FEET ALONG THE BRIDGE APPROACHES.

HYDRAULIC DATA

HYDRAULIC DESIGN DATA

DRAINAGE AREA:_____ 117.8 SQUARE MILES
DESIGN FLOOD DISCHARGE:_____ 2280 CUBIC FEET PER SECOND
DESIGN FLOOD FREQUENCY:_____ 10 YEARS
DESIGN FLOOD VELOCITY:_____ UNKNOWN
DESIGN FLOOD ELEVATION:_____ 121.4 FEET, NAVD

BASE (100 YEAR) FLOOD DATA

BASE FLOOD DISCHARGE:_____ 4010 CUBIC FEET PER SECOND
BASE FLOOD ELEVATION:_____ 126.2 FEET, NAVD

DESIGN AND CHECK SCOUR DATA

DESIGN SCOUR FLOOD EVENT RETURN FREQUENCY:___ 25 YEARS
CHECK SCOUR FLOOD EVENT RETURN FREQUENCY:___ 50 YEARS

FLOOD OF RECORD

DISCHARGE:_____ UNKNOWN
FREQUENCY:_____ UNKNOWN
MAXIMUM ELEVATION:_____ UNKNOWN
DATE:_____ AUGUST 1955
HISTORY OF ICE FLOES:_____ NONE DOCUMENTED IN FIS
EVIDENCE OF SCOUR AND EROSION:_____ NONE OBSERVED

ESTIMATED QUANTITIES

(NOT GUARANTEED)

ITEM DESCRIPTION	QUANTITY	UNIT
BRIDGE EXCAVATION	20	CY
GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	5	CY
STONE MASONRY WALL IN CEMENT MORTAR	10	CY
STONE MASONRY WALL REMOVED, BRIDGE NO. C–19–031 (A0T)	40	CY
CORING AND GROUTING DOWELS	44	EA
BRIDGE SUPERSTRUCTURE, BRIDGE NO. C–19–031 (A0T)	1	LS

CONCORD
BRUCE FREEMAN RAIL TRAIL PHASE 2C

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-----	268	328
PROJECT FILE NO. 605189			

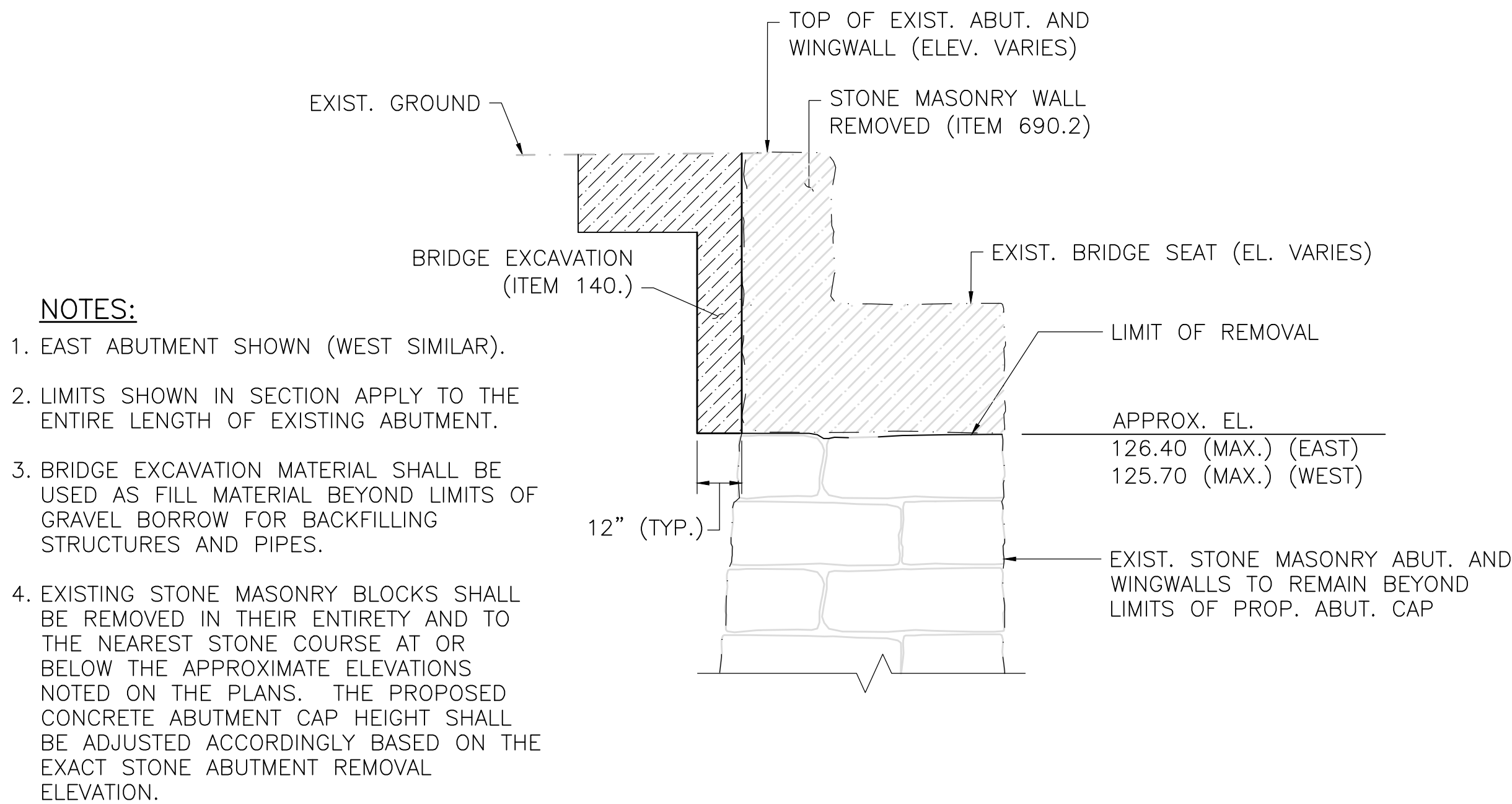
GENERAL NOTES AND ESTIMATED QUANTITIES

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

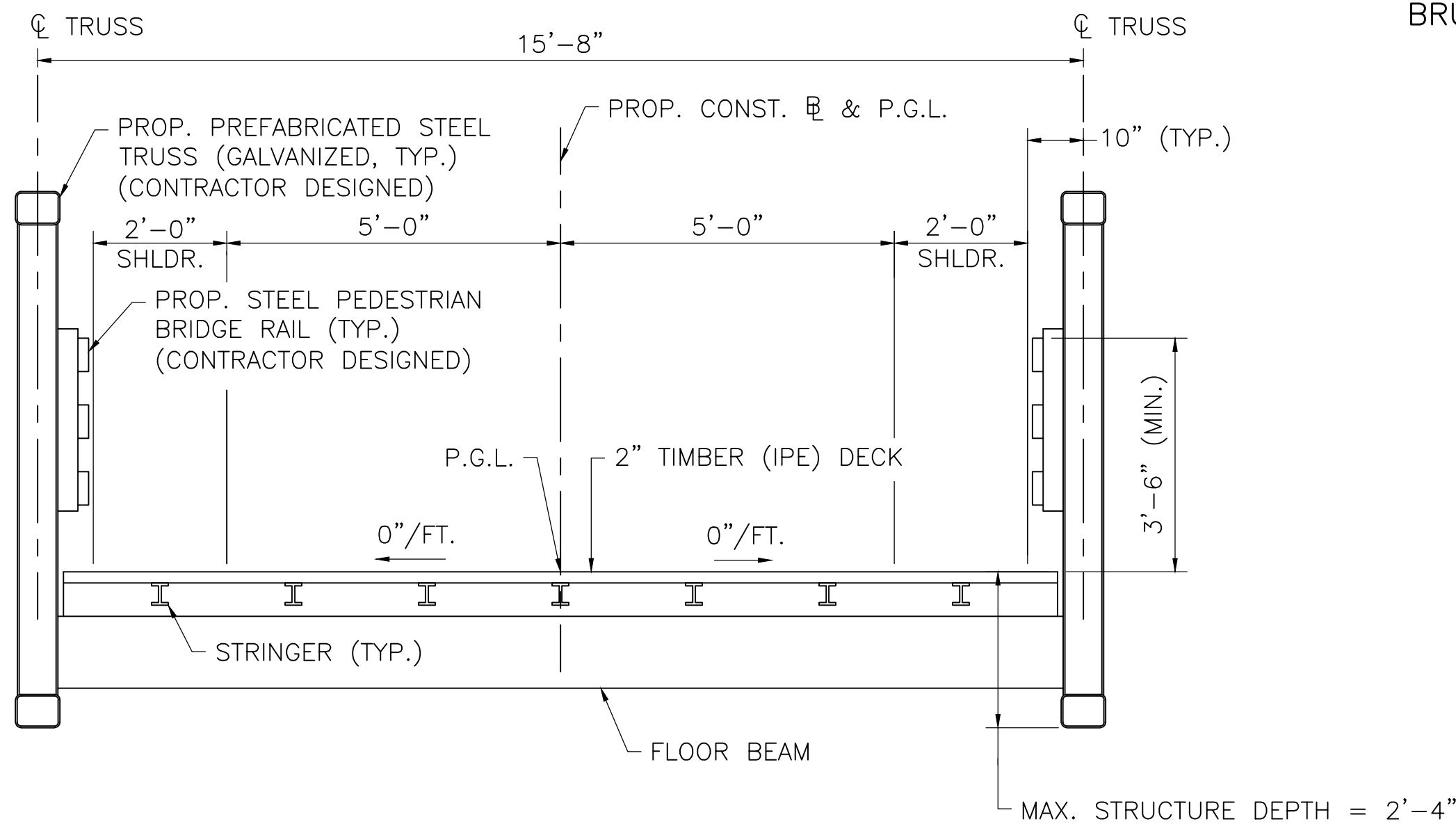
SHEET 2 OF 5 SHEETS BRIDGE NO. C–19–031 (A0T)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	----	269	328
PROJECT FILE NO. 605189			

ELEVATION AND CROSS SECTION

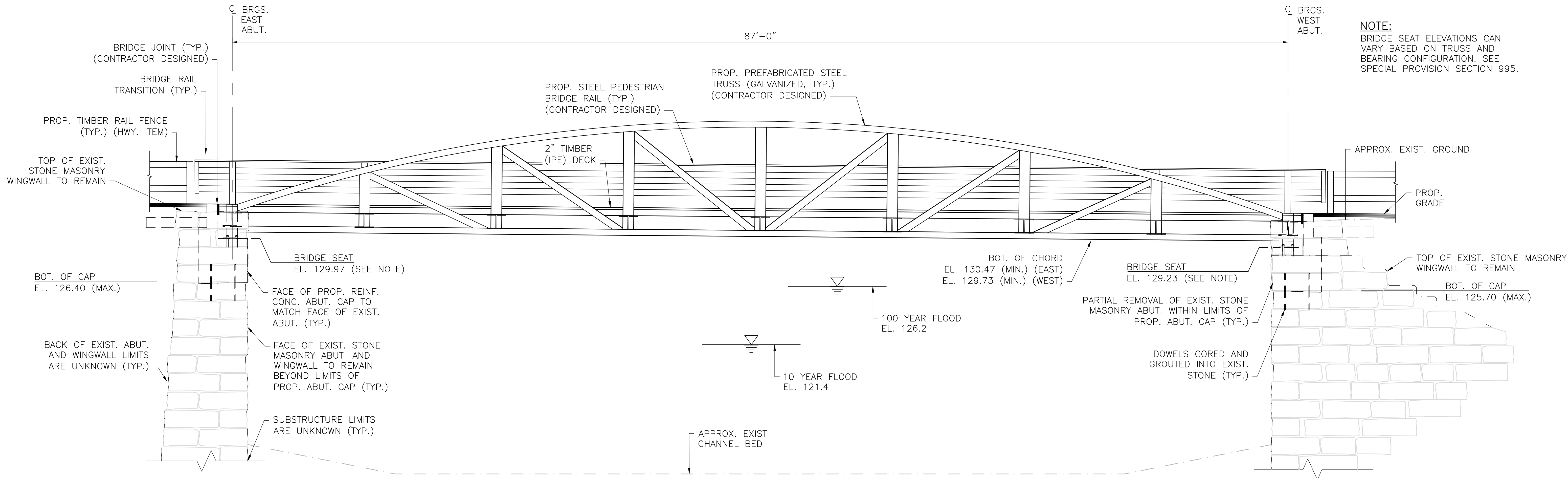


EXCAVATION AND WALL REMOVAL PAYMENT LIMITS
SCALE: 3/8" = 1'-0"



NOTE:
DIMENSIONS SHOWN ARE APPROXIMATE AND WILL BE FINALIZED BY THE PREFABRICATED TRUSS DESIGNER.

PROPOSED CROSS SECTION
SCALE: 1/2" = 1'-0"



ELEVATION
SCALE: 1/4" = 1'-0"

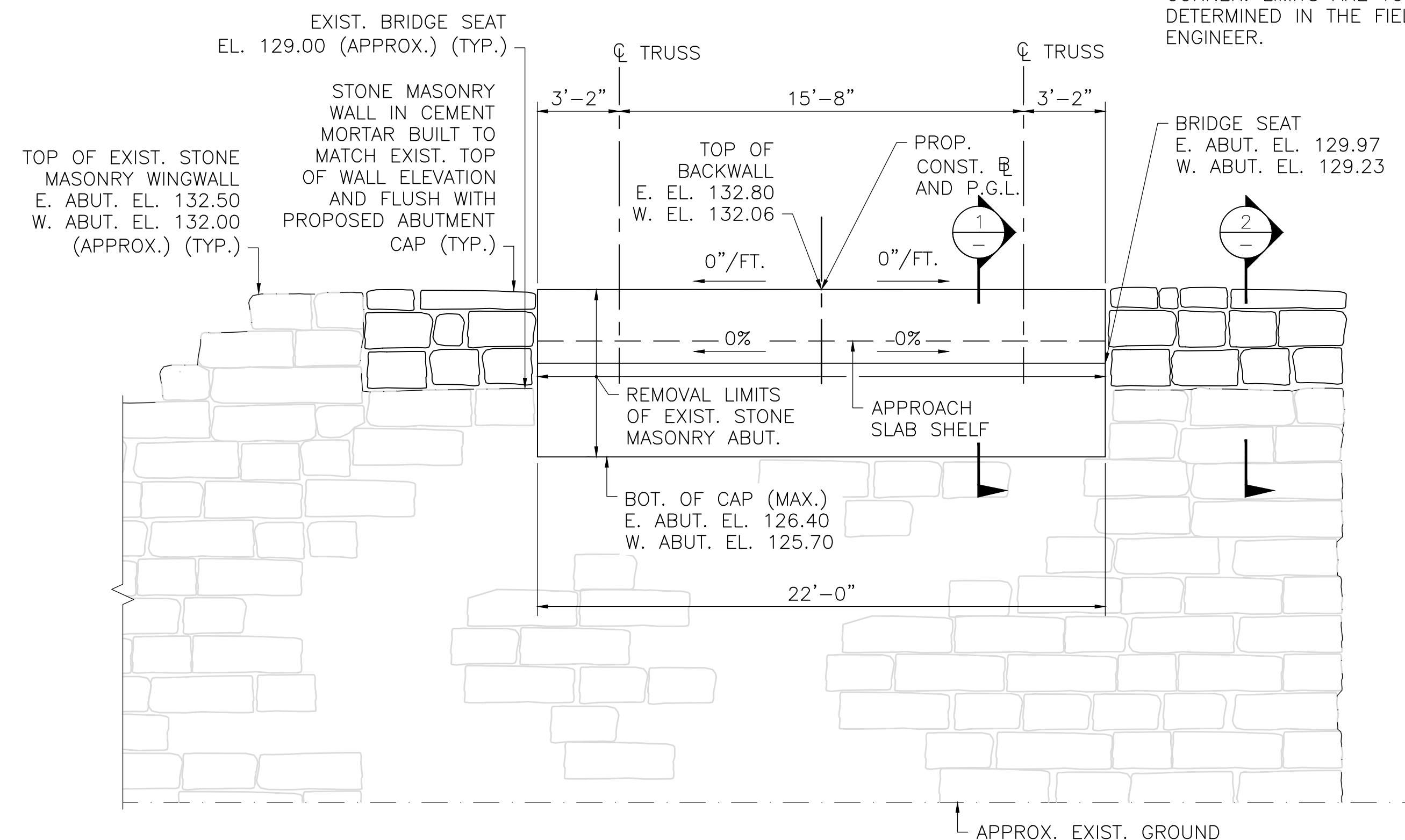
MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

This plan view diagram illustrates the proposed construction for a bridge abutment and wingwall. The central feature is the **CL TRUSS**, with a stationing point of **STA. 116+21.33**. The abutment is shown with a **90°0'0"** angle. Key dimensions and features include:

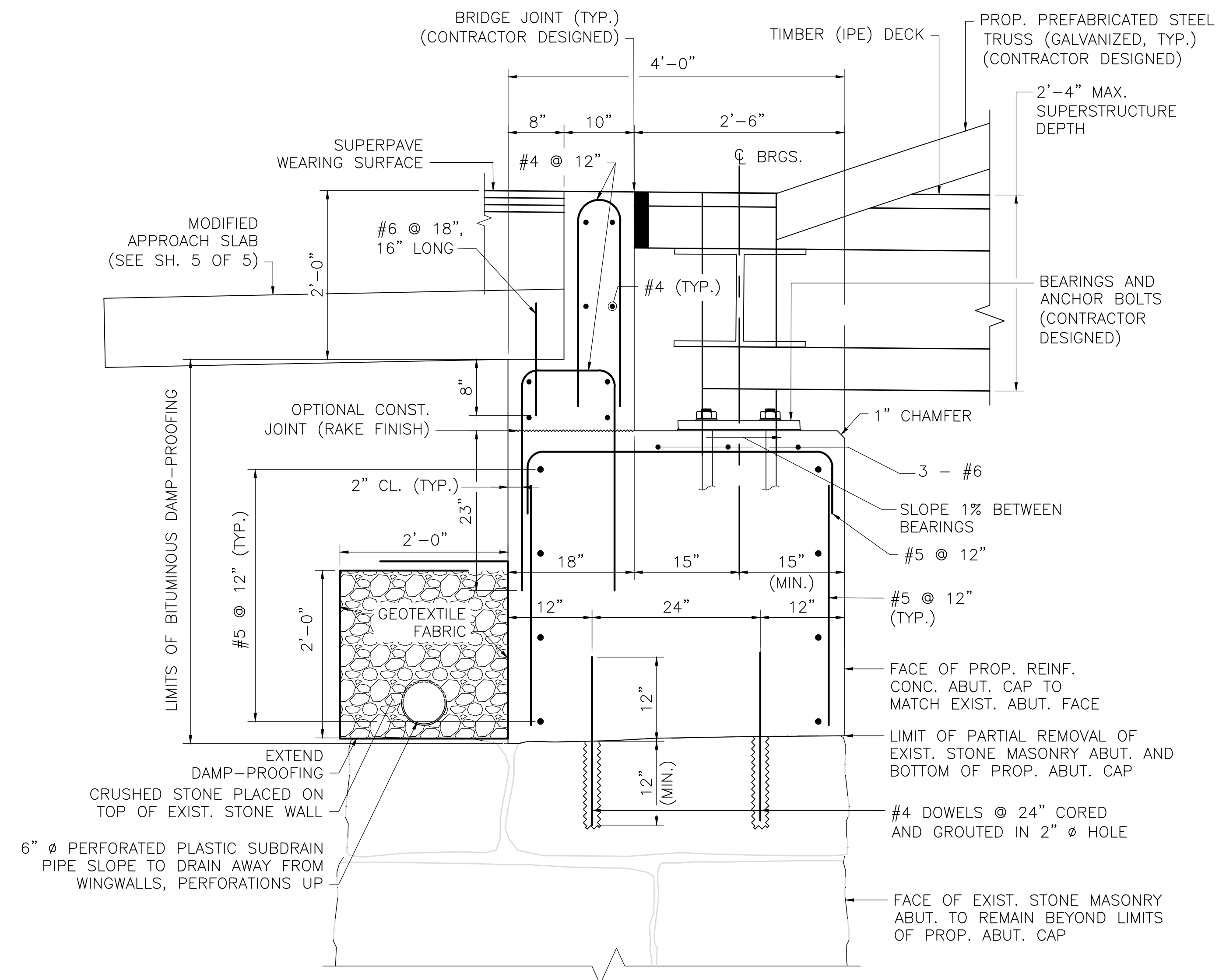
- Wingwall Dimensions:** The wingwall on the left is **6'-8"± (EAST)** and **6'-6"± (WEST)** (approx. varies). The wingwall on the right is **9'-1"± (EAST)** and **5'-9"± (WEST)** (approx. varies).
- Approach Slab:** An **8" APPROACH SLAB SHELF** is indicated on the right side.
- Backwall:** An **18" ABUT. BACKWALL** is shown on the right, with a **15'-15"** dimension.
- Reinforcement and Concrete:** The diagram shows the **FACE OF PROP. REINF. CONC. ABUT. CAP TO MATCH EXIST. ABUT. FACE**. A **CL TRUSS** is also indicated in the center.
- Dimensions:** Horizontal dimensions from the centerline include **3'-2"**, **7'-10"**, **7'-10"**, and **3'-2"**. A vertical dimension of **15'-15"** is shown for the backwall.
- Existing Structures:** **EXIST. STONE MASONRY WINGWALL TO REMAIN** is shown on the left, and **EXIST. STONE MASONRY WINGWALL TO REMAIN** is shown on the right.
- Partial Removal:** A note indicates **PARTIAL REMOVAL OF EXIST. STONE MASONRY ABUT. WITHIN LIMITS OF PROP. ABUT. CAP**.

SCALE: $\frac{1}{4}" = 1'-0"$

1. EAST ABUTMENT SHOWN, WEST SIMILAR, BUT OPPOSITE.
2. REBAR AND DOWELS NOT SHOWN FOR CLARITY.
3. LIMITS OF STONE MASONRY WALL IN CEMENT MORTAR ARE APPROXIMATE AND VARY AT EACH CORNER. LIMITS ARE TO BE DETERMINED IN THE FIELD BY THE ENGINEER.

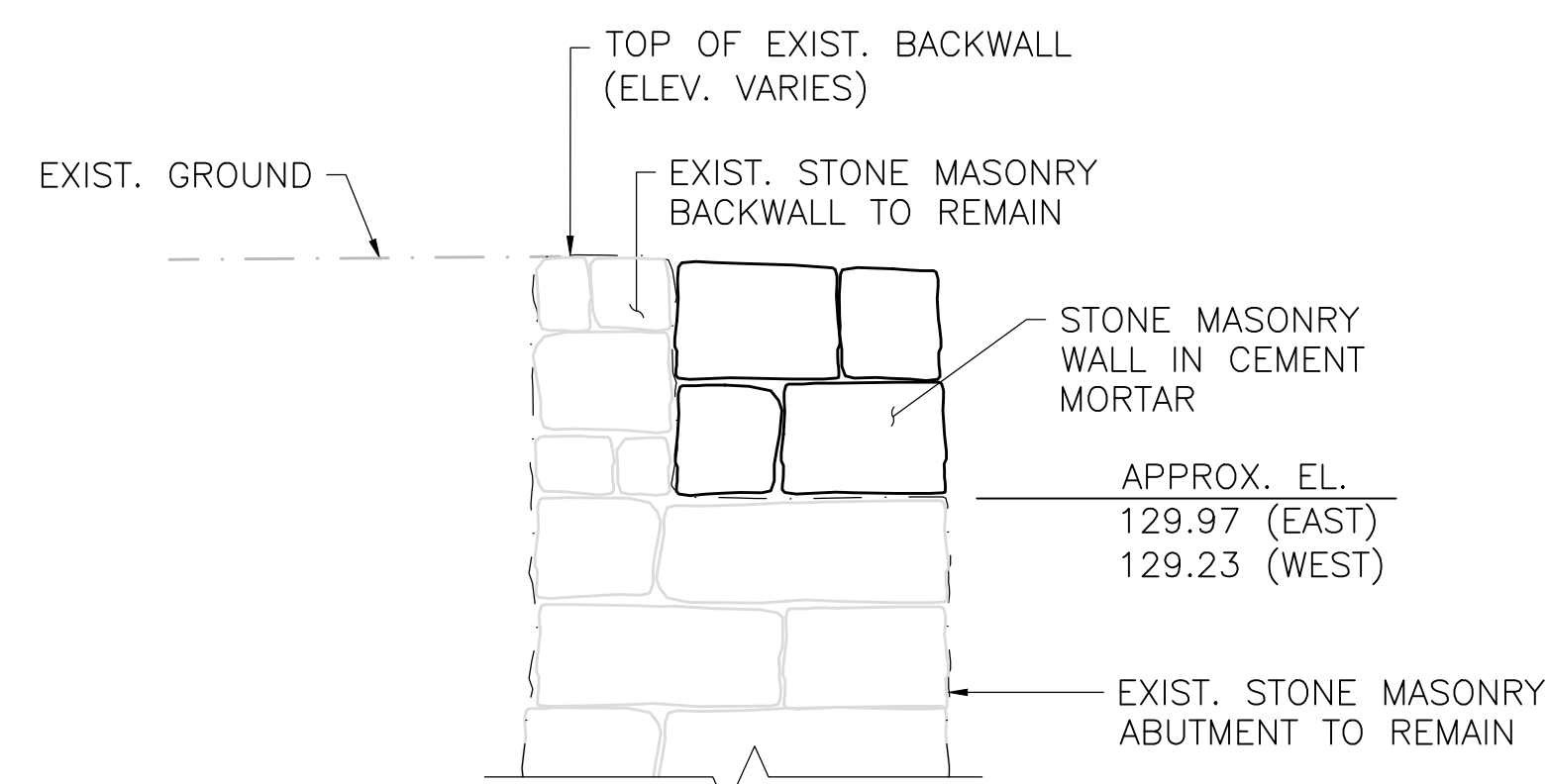


SCALE: $\frac{1}{4}" = 1'-0"$



SCALE: 1" = 1'-0"

1. ALL REINFORCEMENT SHOWN IN THIS DETAIL SHALL BE EPOXY COATED.
2. ALL ABUTMENT CAP AND BACKWALL CONCRETE SHALL BE 4000 PSI, $\frac{3}{4}$ IN, 610 CEMENT CONCRETE. THE OPTIONAL CONSTRUCTION JOINT SHALL BE GIVEN A RAKE FINISH WITH A $\frac{1}{4}$ " MINIMUM AMPLITUDE.
3. TOP OF BACKWALL SHALL BE TROWELLED SMOOTH PARALLEL TO THE PROFILE GRADE.
4. THE DECK JOINT SHALL CONFORM TO ADA/AAB REQUIREMENTS.
5. GEOTEXTILE FABRIC AS DESCRIBED IN SECTION M9.50.
6. PIPE SHALL BE SET ON TOP OF CRUSHED STONE PLACED ON EXISTING STONE WALL AT BOTTOM OF TRENCH DUG FOR THE REMOVAL OF STONE BLOCKS.



SCALE: $\frac{3}{8}" = 1'-0"$

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

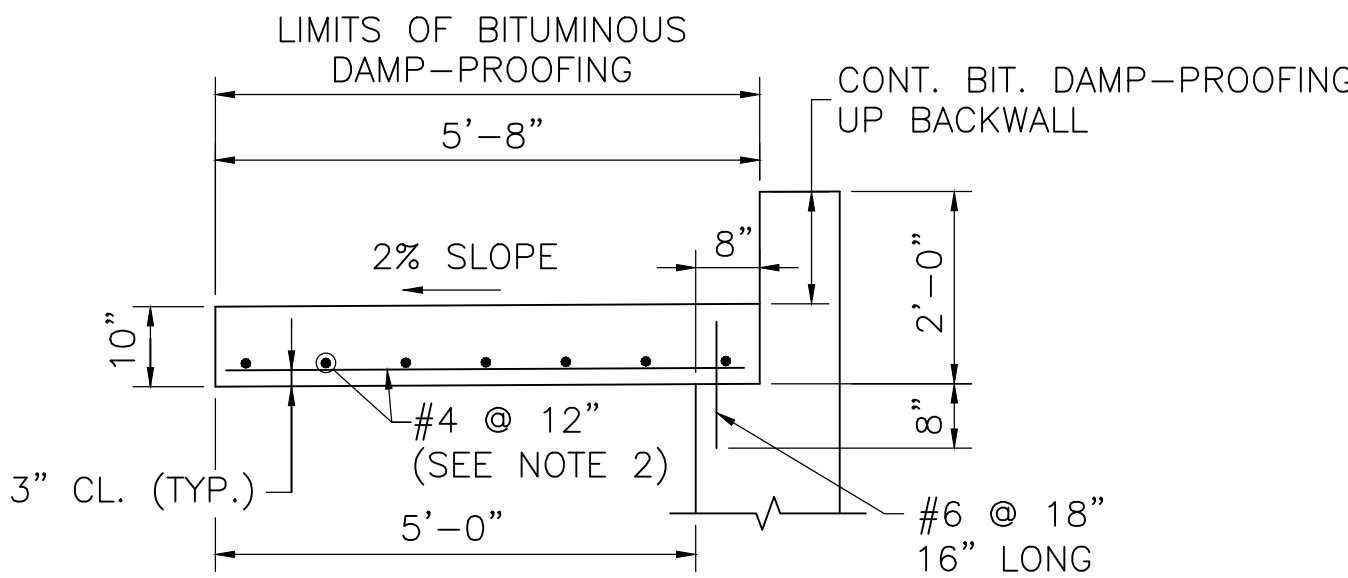
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	----	271	328
PROJECT FILE NO. 605189			

APPROACH SLAB AND MISC. DETAILS

NOTE:
EXIST. STONE MASONRY ABUTMENTS
AND WINGWALLS NOT SHOWN FOR
CLARITY.

TYPICAL APPROACH SLAB PLAN

SCALE: 1/4" = 1'-0"

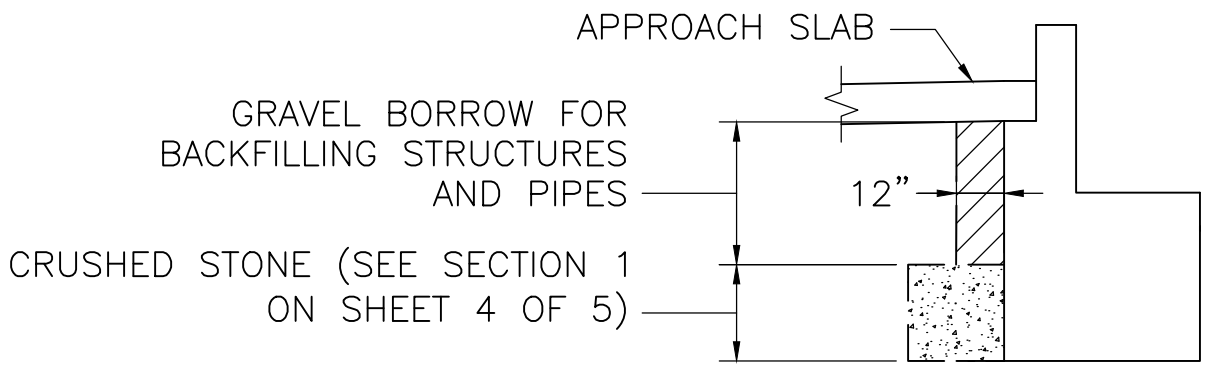


NOTES:

1. APPROACH SLAB TO BE 4000 PSI, 1 1/2 IN, 565 CEMENT CONCRETE.
2. PLACE LONGITUDINAL REINFORCEMENT PERPENDICULAR TO THE ABUTMENT CAP.
3. PLACE TRANSVERSE REINFORCEMENT PARALLEL TO ABUTMENT CAP.

TYPICAL APPROACH SLAB DETAILS

SCALE: 1/2" = 1'-0"

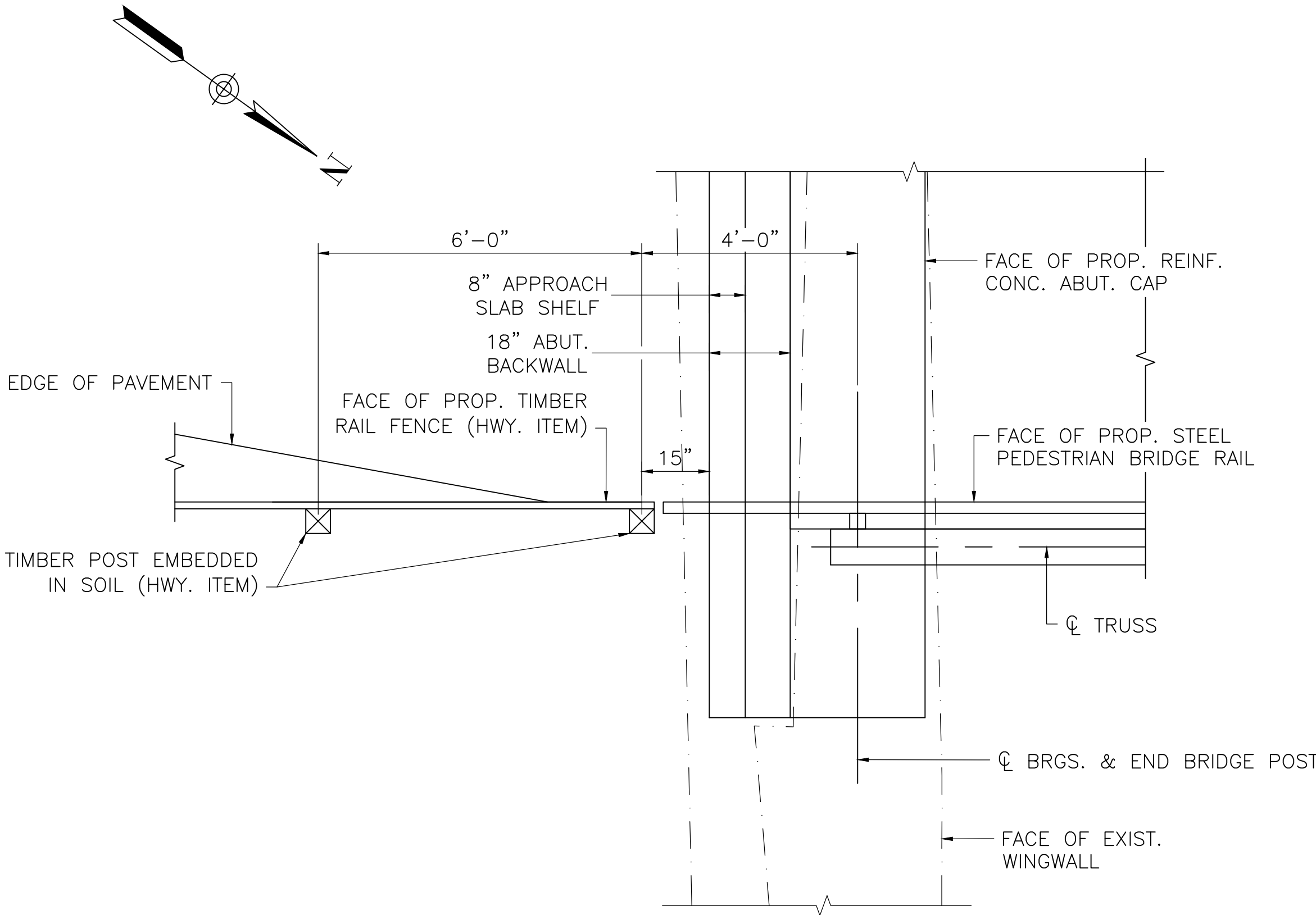


ABUTMENT CAP

LIMITS OF GRAVEL BORROW FOR
BACKFILLING STRUCTURES AND PIPES

SCALE: 1/4" = 1'-0"

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

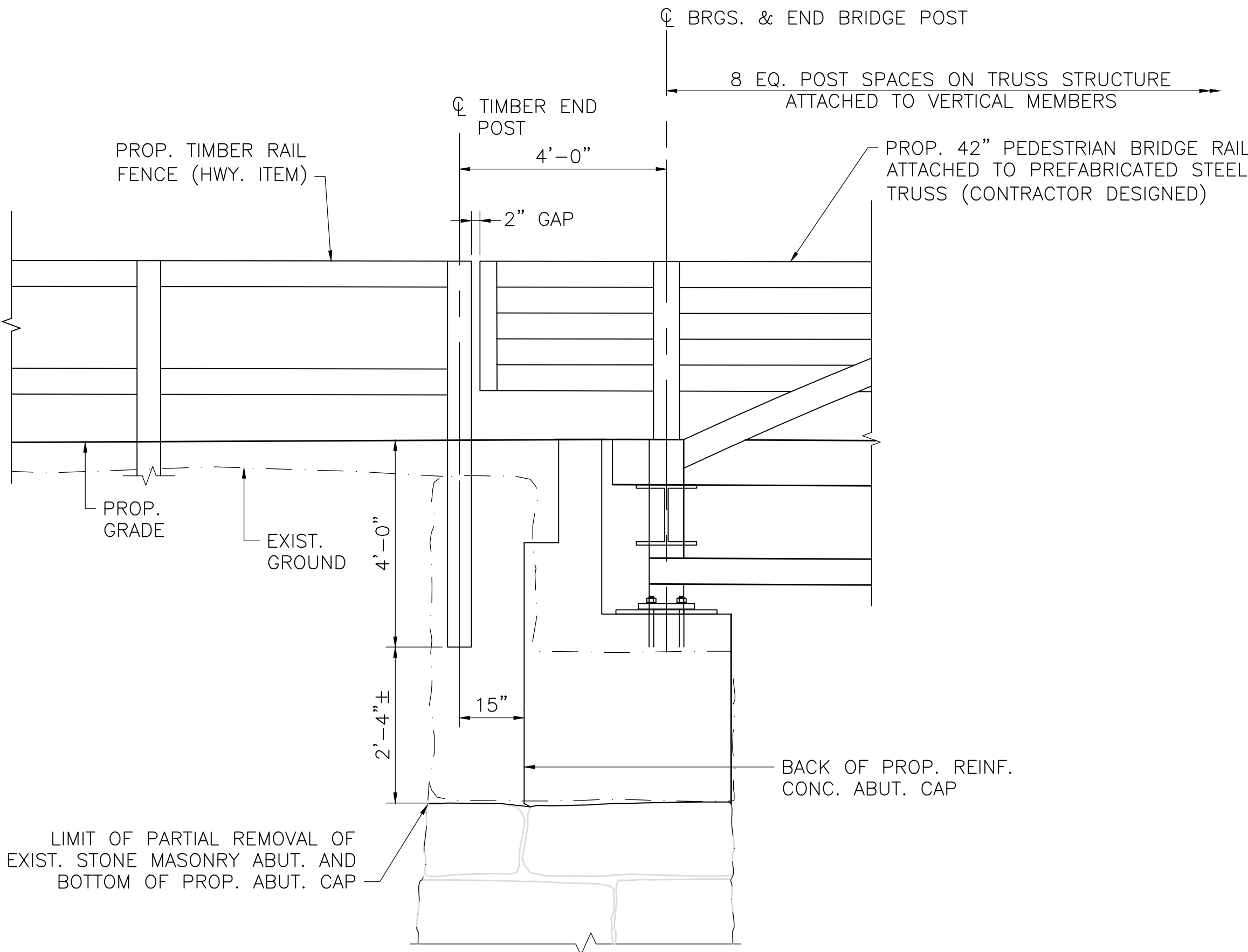


TYPICAL BRIDGE RAIL TRANSITION - PLAN

SCALE: 1/2" = 1'-0"

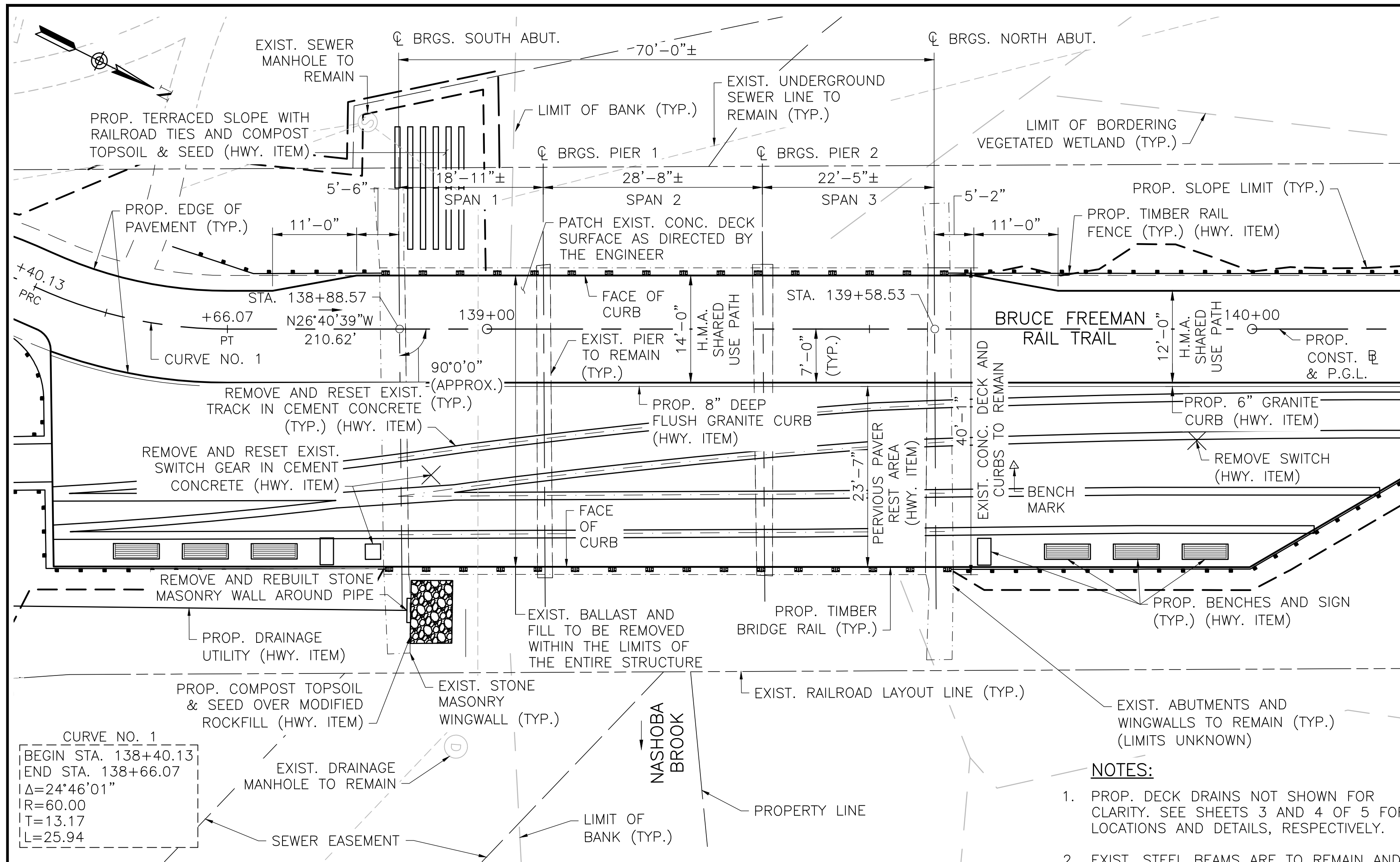
NOTE:

NE CORNER SHOWN.
OTHERS ARE SIMILAR.

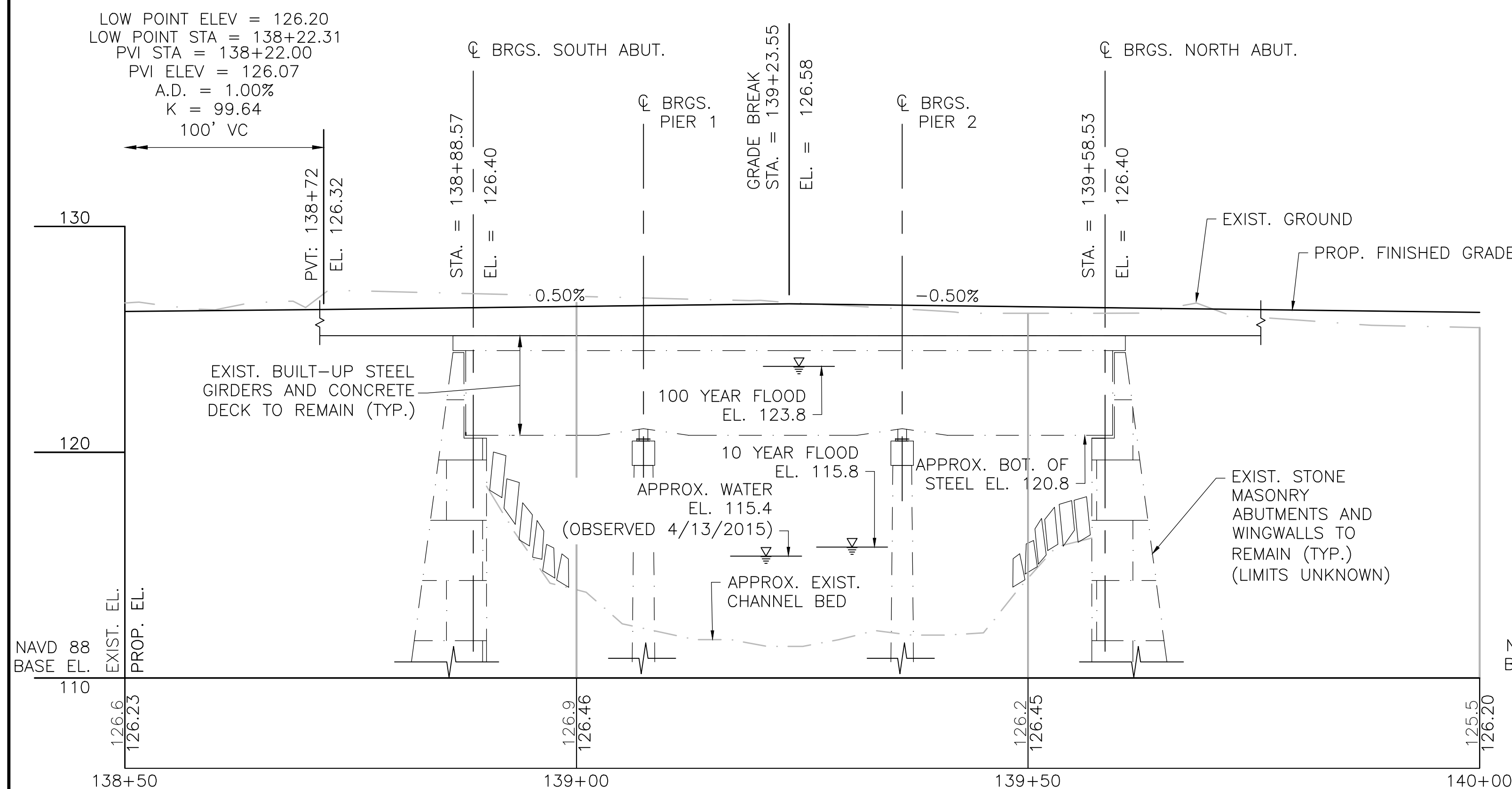


TYPICAL BRIDGE RAIL TRANSITION - ELEVATION

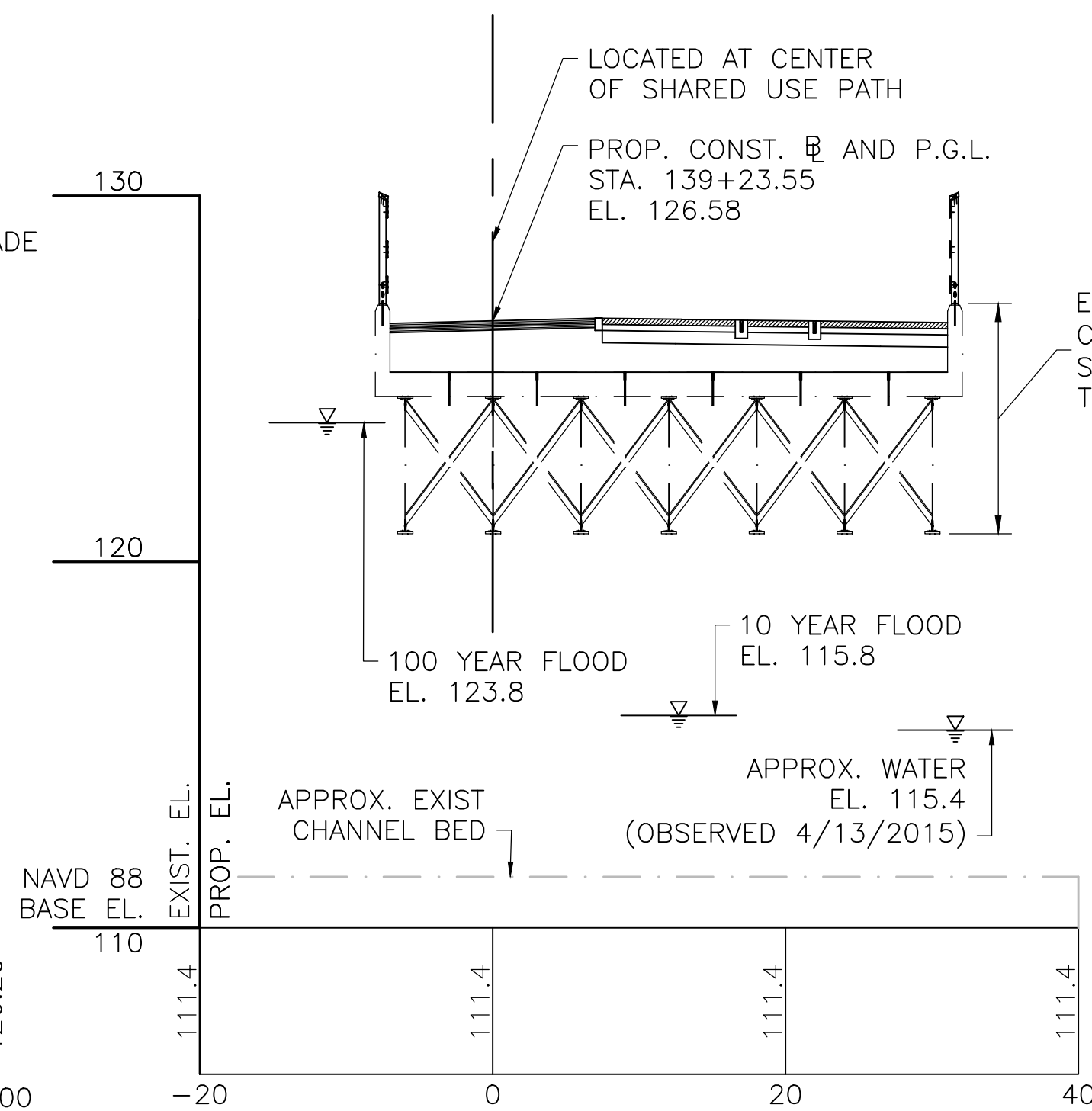
SCALE: 1/2" = 1'-0"



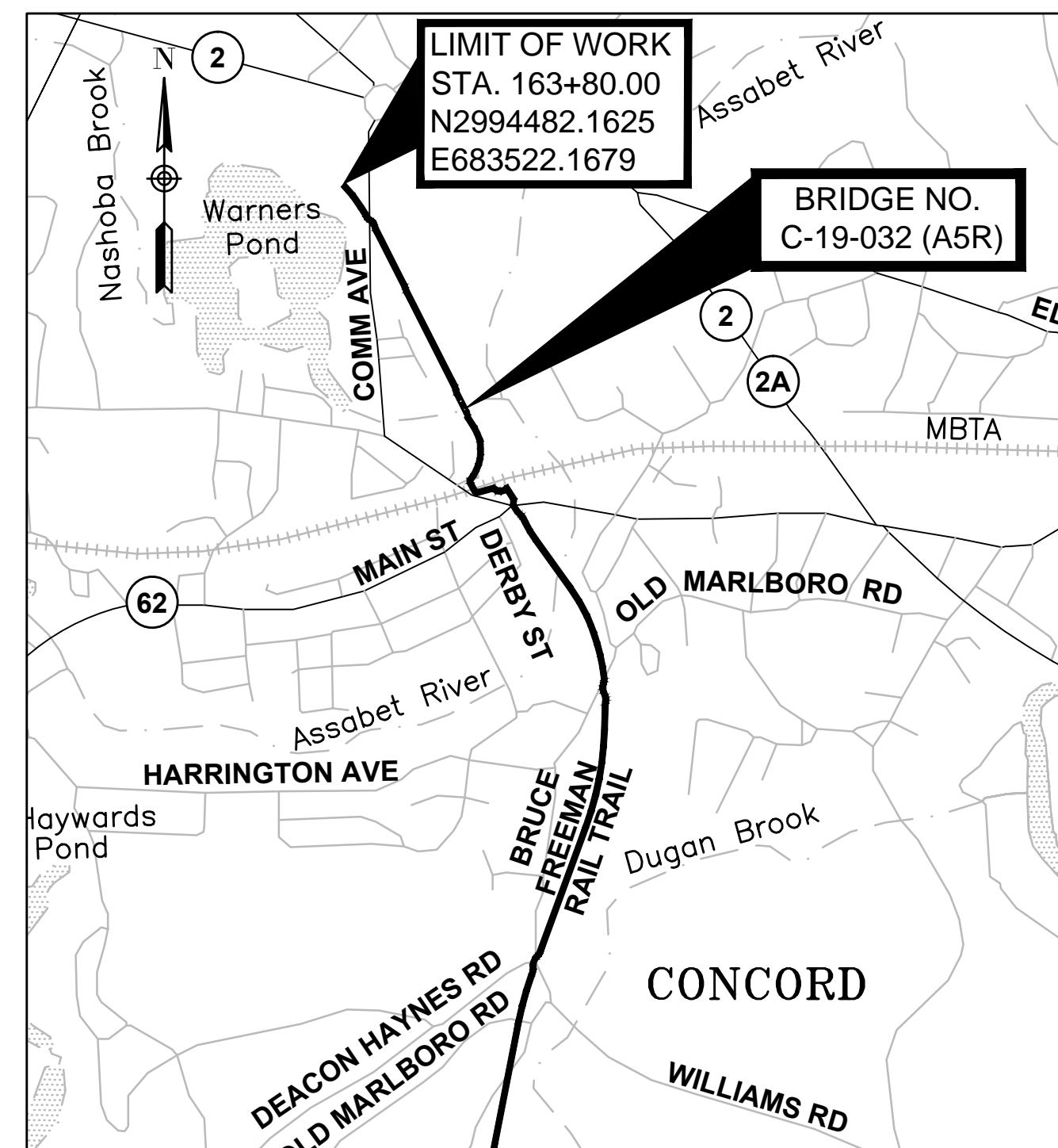
KEY PLAN
SCALE: 1" = 10'



PROFILE — ALONG CONST. & P.G.L.
SCALE: 1" = 10' HORIZ.
1/4" = 1'-0" VERT.



PROFILE — ALONG NASHOBA BROOK
SCALE: 1" = 10' HORIZ.
1/4" = 1'-0" VERT.



LOCUS
SCALE: 1" = 1500'

**CONCORD
BRUCE FREEMAN RAIL TRAIL PHASE 2C**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-----	272	328
PROJECT FILE NO. 605189			



KEY PLAN, LOCUS MAP, AND PROFILES

INDEX OF BRIDGE SHEETS:

1. KEY PLAN, LOCUS MAP, AND PROFILES
2. GENERAL NOTES AND ESTIMATED QUANTITIES
3. ELEVATION AND CROSS SECTION
- 4-5. BRIDGE DETAILS

NOTE:

FOR GENERAL NOTES, SEE SHEET 2.

MONTH DD, YYYY		ISSUED FOR CONSTRUCTION	
 BRIDGE REHABILITATION CONCORD BRUCE FREEMAN RAIL TRAIL OVER NASHOBA BROOK MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION 10 PARK PLAZA BOSTON, MASS		TITLE: _____ CHIEF ENGINEER	
		Greenman-Pedersen, Inc.  181 Ballardvale Street, Suite 202 Wilmington, MA 01887	

GENERAL NOTES

DESIGN:

IN ACCORDANCE WITH THE 2014 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION WITH CURRENT INTERIM SPECIFICATIONS THROUGH 2015 AND THE 2009 AASHTO LRFD GUIDE SPECIFICATIONS FOR THE DESIGN OF PEDESTRIAN BRIDGES, FOR H10 LOADING AND 90 PSF PEDESTRIAN LOADING.

MASSDOT BENCH MARK:

REBAR CAP 80040
N2992379.88 E684672.95
STA. 139+68.89 17.86’ RT
EL. 125.76’

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

MASSDOT SURVEY NOTEBOOKS:

COPIES OF ELECTRONIC SURVEY FILES MAY BE OBTAINED FROM THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION – HIGHWAY DIVISION.

SCALES:

SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZED PRINTS. DIVIDE SCALES BY 2 FOR HALF–SIZE PRINTS (A3).

FOUNDATIONS:

FOUNDATIONS MAY BE ALTERED, IF NECESSARY, TO SUIT CONDITIONS ENCOUNTERED DURING CONSTRUCTION, WITH THE APPROVAL OF THE ENGINEER.

UNSUITABLE MATERIAL:

ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATIONS OF THE STRUCTURE, AS DIRECTED BY THE ENGINEER.

SEISMIC GROUND SHAKING HAZARD:

DESIGN RETURN PERIOD: 1000 YEARS

DESIGN SPECTRA:

As = 0.118
Sds = 0.243
Sd1 = 0.096

SITE CLASS = D

SEISMIC DESIGN CATEGORY (SDC) = A

ANCHOR BOLTS:

ANCHOR BOLTS FOR TIMBER RAIL FENCE ON BRIDGE SHALL BE POST–INSTALLED.

REINFORCEMENT:

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60 (EPOXY COATED). UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

MODIFICATION CONDITION	#4 BARS	#5 BARS
1. NONE	21"	26"
2. 12" OF CONCRETE BELOW BAR	29"	36"
3. COATED BARS, COVER < 3db, OR CLEAR SPACING < 6db	31"	39"
4. COATED BARS, ALL OTHER CASES	25"	31"
5. CONDITION 2. AND 3.	35"	44"
6. CONDITION 2. AND 4.	34"	43"
IF THE ABOVE BARS ARE SPACED 6" OR MORE ON CENTER, THE LAP LENGTH SHALL BE 80% OF THE LAP LENGTH GIVEN ABOVE. ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.		

CONCRETE MIXES:

(1)	(2)	(3)	TO BE USED IN CONSTRUCTION OF:
4000	$\frac{3}{4}$	610	RESET RAILROAD SWITCH AND SWITCH GEAR (HWY. ITEM)
4000	$1\frac{1}{2}$	565	PIPE END IN STONE MASONRY WINGWALL

- (1) 28 DAY COMPRESSIVE STRENGTH (PSI)
(2) MAXIMUM AGGREGATE SIZE (INCH)
(3) CEMENTITIOUS CONTENT (POUNDS/C.Y.)

CONSTRUCTION ACCESS RESTRICTION:

THE CONTRACTOR IS DIRECTED TO SUPPLEMENTAL SPECIFICATION SECTION 901.67 FOR RESTRICTIONS OF LOADING ON THE NEWLY RECONSTRUCTED PORTIONS OF THE BRIDGE. ANY LOADING EXCEEDING AN H20 VEHICLE SHALL BE RESTRICTED FROM TRAVELING OVER THE BRIDGE. THE CONTRACTOR MAY ELECT TO SUBMIT CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE COMMONWEALTH OF MASSACHUSETTS TO THE ENGINEER FOR APPROVAL, WHICH DEMONSTRATE THAT CONSTRUCTION LOADS CAN SAFELY TRAVEL OVER THE STRUCTURE.

EXISTING BRIDGE DIMENSIONS:

THE EXISTING BRIDGE DIMENSIONS SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING BRIDGE DIMENSIONS PRIOR TO CONSTRUCTION.

HYDRAULIC DATA

HYDRAULIC DESIGN DATA

DRAINAGE AREA: 46.8 SQUARE MILES
DESIGN FLOOD DISCHARGE: 780 CUBIC FEET PER SECOND
DESIGN FLOOD FREQUENCY: 10 YEARS
DESIGN FLOOD VELOCITY: 3.6 FEET PER SECOND
DESIGN FLOOD ELEVATION: 115.8 FEET, NAVD

BASE (100 YEAR) FLOOD DATA

BASE FLOOD DISCHARGE: 1600 CUBIC FEET PER SECOND
BASE FLOOD ELEVATION: 123.8 FEET, NAVD

DESIGN AND CHECK SCOUR DATA

DESIGN SCOUR FLOOD EVENT RETURN FREQUENCY: 25 YEARS
CHECK SCOUR FLOOD EVENT RETURN FREQUENCY: 50 YEARS

FLOOD OF RECORD

DISCHARGE: UNKNOWN
FREQUENCY: UNKNOWN
MAXIMUM ELEVATION: UNKNOWN
DATE: AUGUST 1955
HISTORY OF ICE FLOES: NONE DOCUMENTED IN NBIS DATABASE
EVIDENCE OF SCOUR AND EROSION: NONE OBSERVED

ESTIMATED QUANTITIES

(NOT GUARANTEED)

ITEM DESCRIPTION	QUANTITY	UNIT
BLEEDER (BRIDGE DECK) PVC	48	EA
REINFORCED CONCRETE DECK EXCAVATION (FULL DEPTH)	15	SY
REINFORCED CONCRETE DECK EXCAVATION (PARTIAL DEPTH)	3	CY
BALLAST EXCAVATION	160	CY
TIMBER RAIL FENCE ON BRIDGE	160	FT
STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR BRIDGE NO. C–19–032 (A5R)	15	CY
STEEL REINFORCEMENT FOR STRUCTURES – EPOXY COATED	1000	LB
CLEAN (FULL REMOVAL) AND PAINT STEEL BRIDGE NO. C–19–032 (A5R)	1	LS
MEMBRANE WATERPROOFING (SPRAY APPLIED)	325	SY

CONCORD
BRUCE FREEMAN RAIL TRAIL PHASE 2C

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	----	273	328
PROJECT FILE NO. 605189			

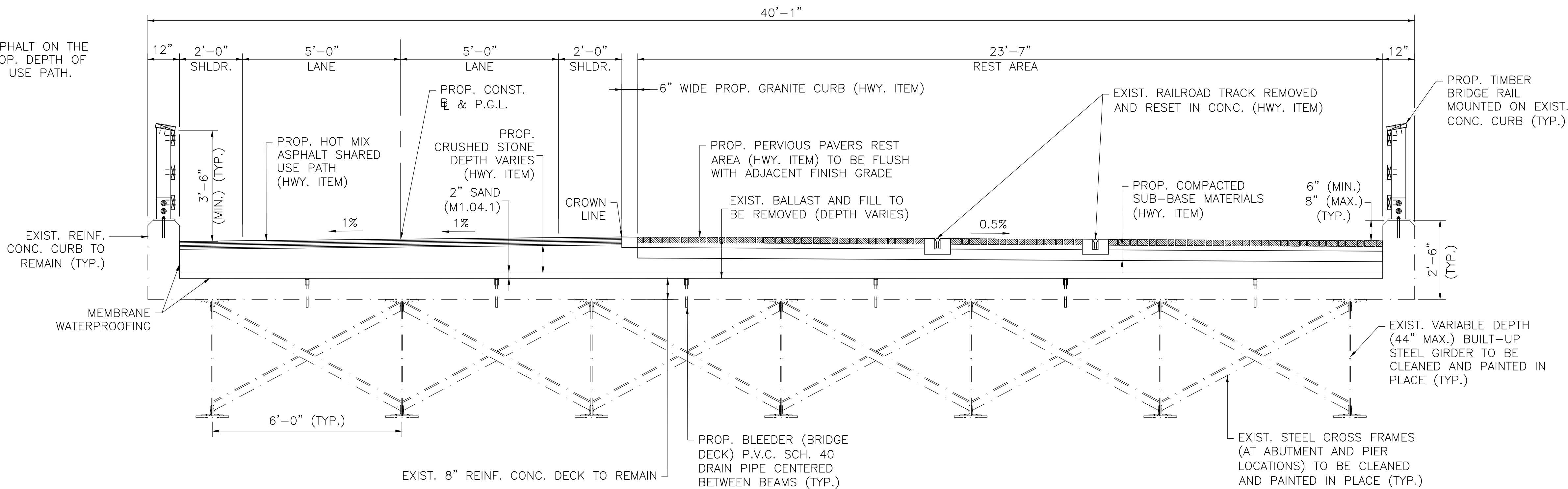
GENERAL NOTES AND ESTIMATED QUANTITIES

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

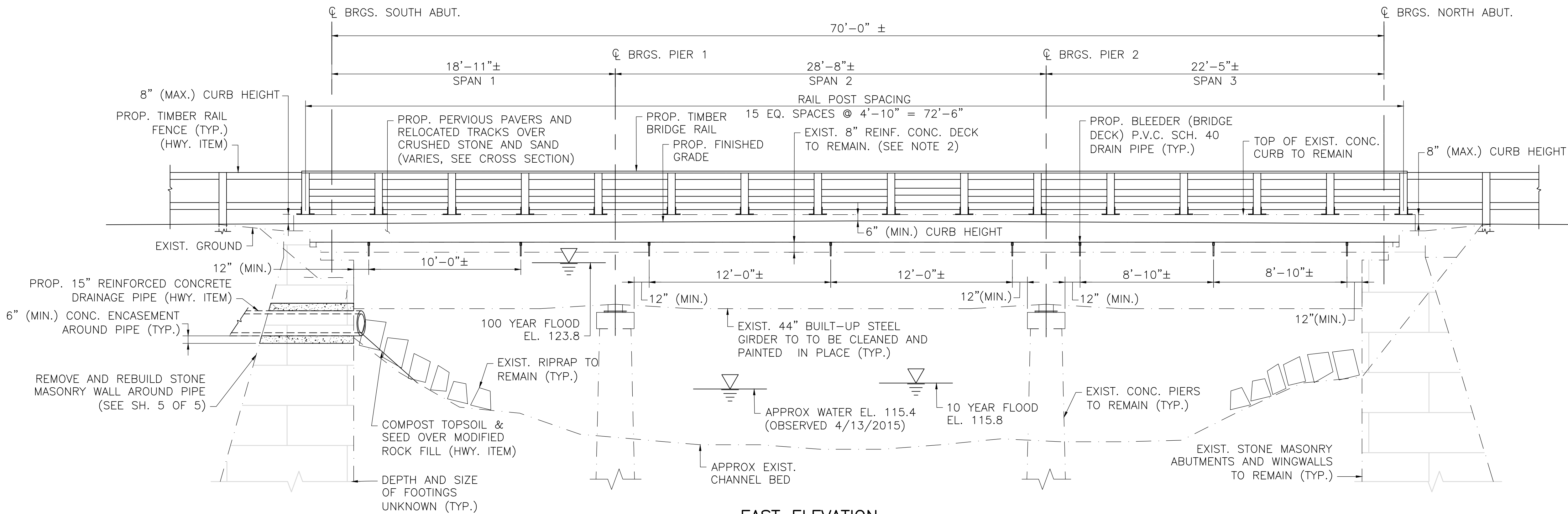
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	----	274	328
PROJECT FILE NO. 605189			

ELEVATION AND CROSS SECTION

NOTE:
THE PROP. DEPTH OF ASPHALT ON THE
BRIDGE MATCHES THE PROP. DEPTH OF
ASPHALT ON THE SHARED USE PATH.



CROSS SECTION
SCALE: 1/2" = 1'



EAST ELEVATION
SCALE: 1/4" = 1'-0"

- NOTES:
- CONTRACTOR SHALL ADJUST RAIL POST SPACING AS REQUIRED BASED ON FIELD VERIFICATION OF CURB LENGTHS. THE POSTS SHALL BE SPACED AT A MAXIMUM OF 5'-0".
 - PATCH REPAIR EXIST. 8" REINF. CONC. DECK WHERE THERE ARE EXPOSED BARS ON THE TOP SIDE OF DECK AND OTHER AREAS OF UNSOUND CONCRETE AS DETERMINED BY THE ENGINEER.

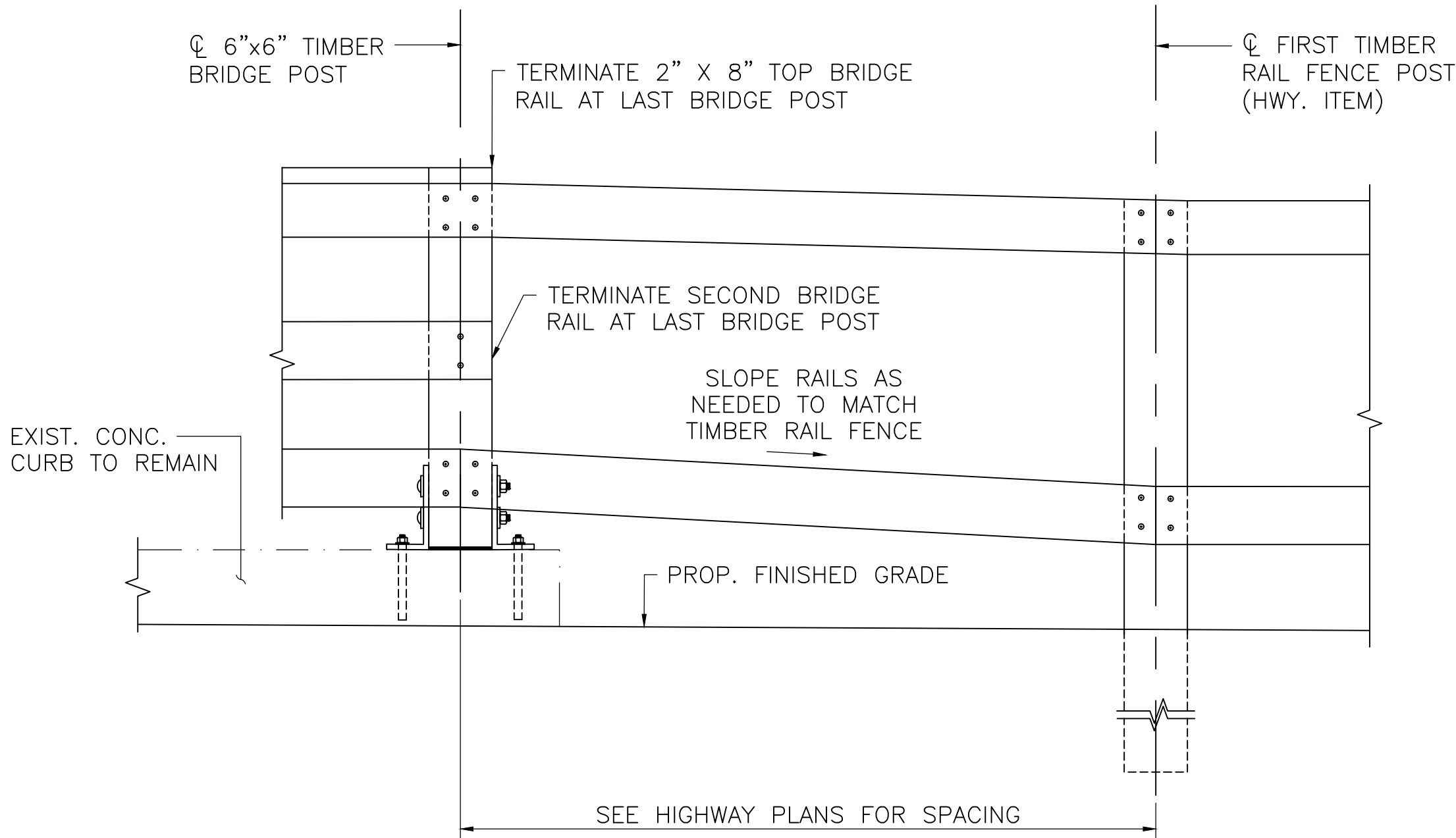
MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	----	275	328
PROJECT FILE NO. 605189			

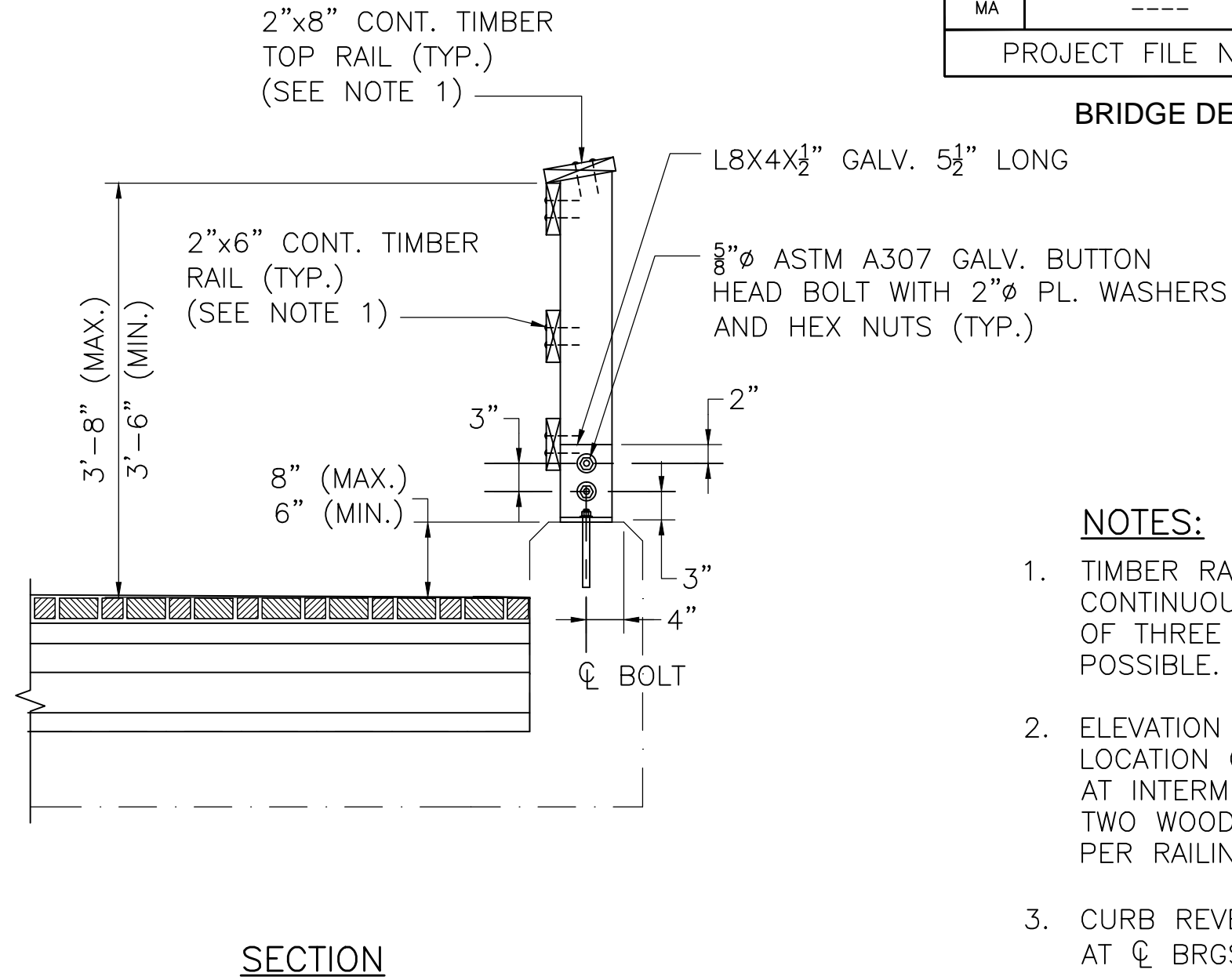
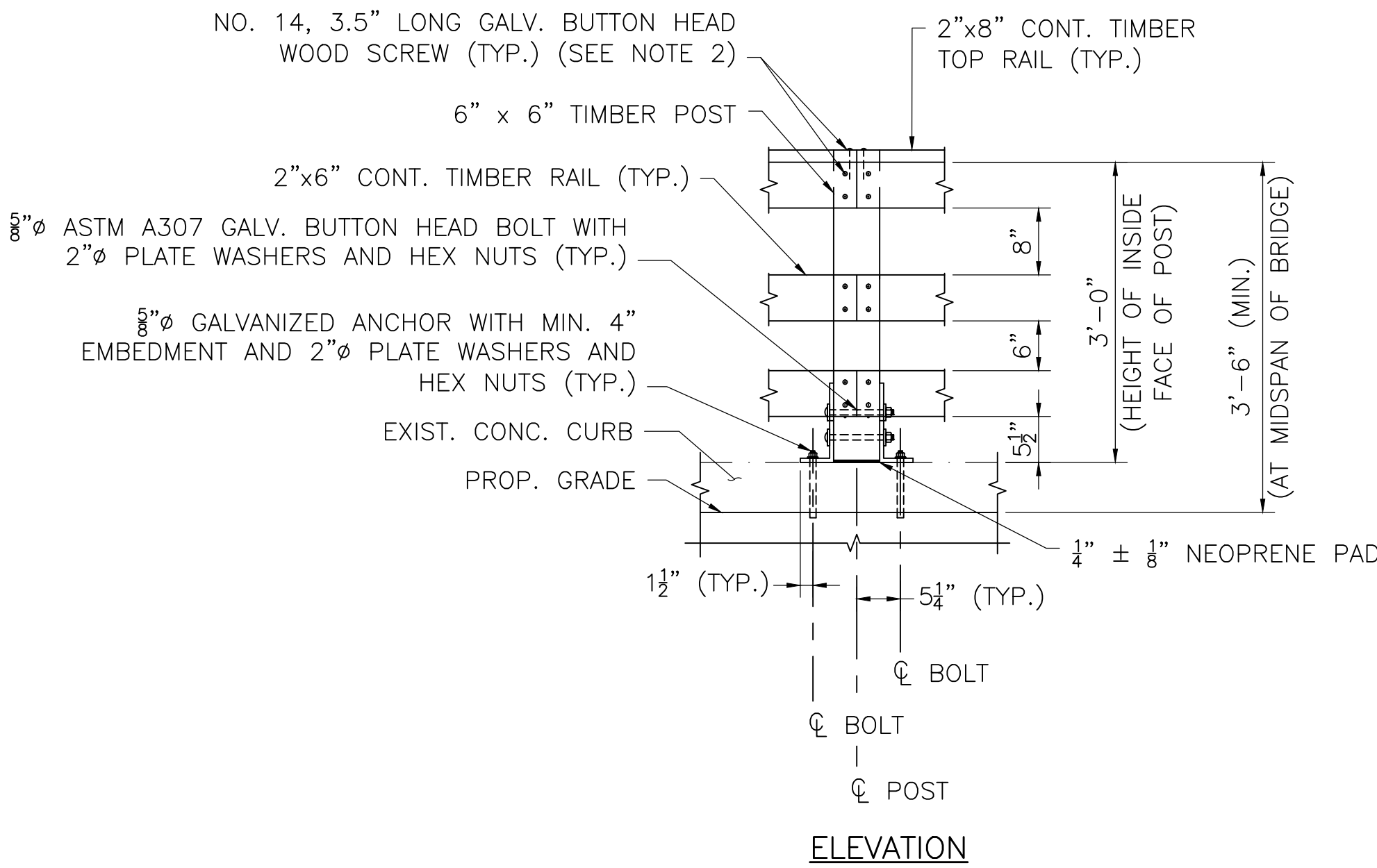
BRIDGE DETAILS

NOTES:

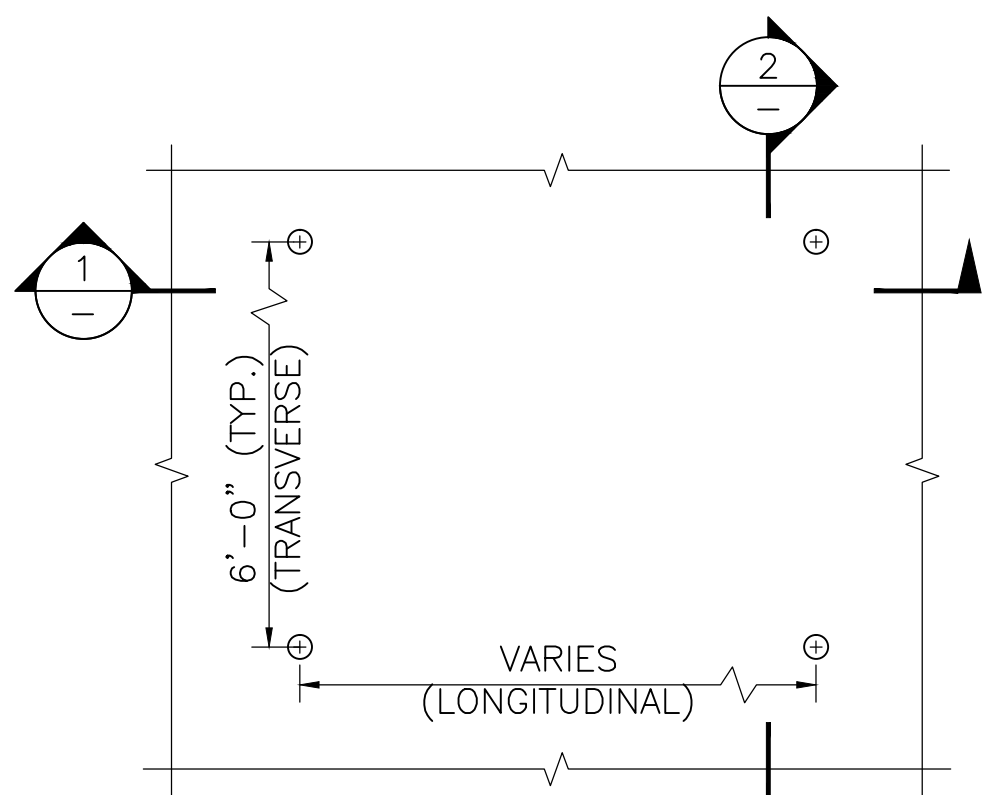
- TIMBER RAIL SHALL BE CONTINUOUS OVER A MINIMUM OF THREE POSTS WHERE POSSIBLE.
- ELEVATION SHOWN REFLECTS LOCATION OF RAIL BUTT JOINT. AT INTERMEDIATE JOINT ONLY TWO WOOD SCREWS REQUIRED PER RAILING.
- CURB REVEALS VARY FROM 8" AT ϕ BRGS. TO 6" AT MIDSPAN.



TIMBER BRIDGE RAIL TRANSITION
SCALE: 1" = 1'-0"

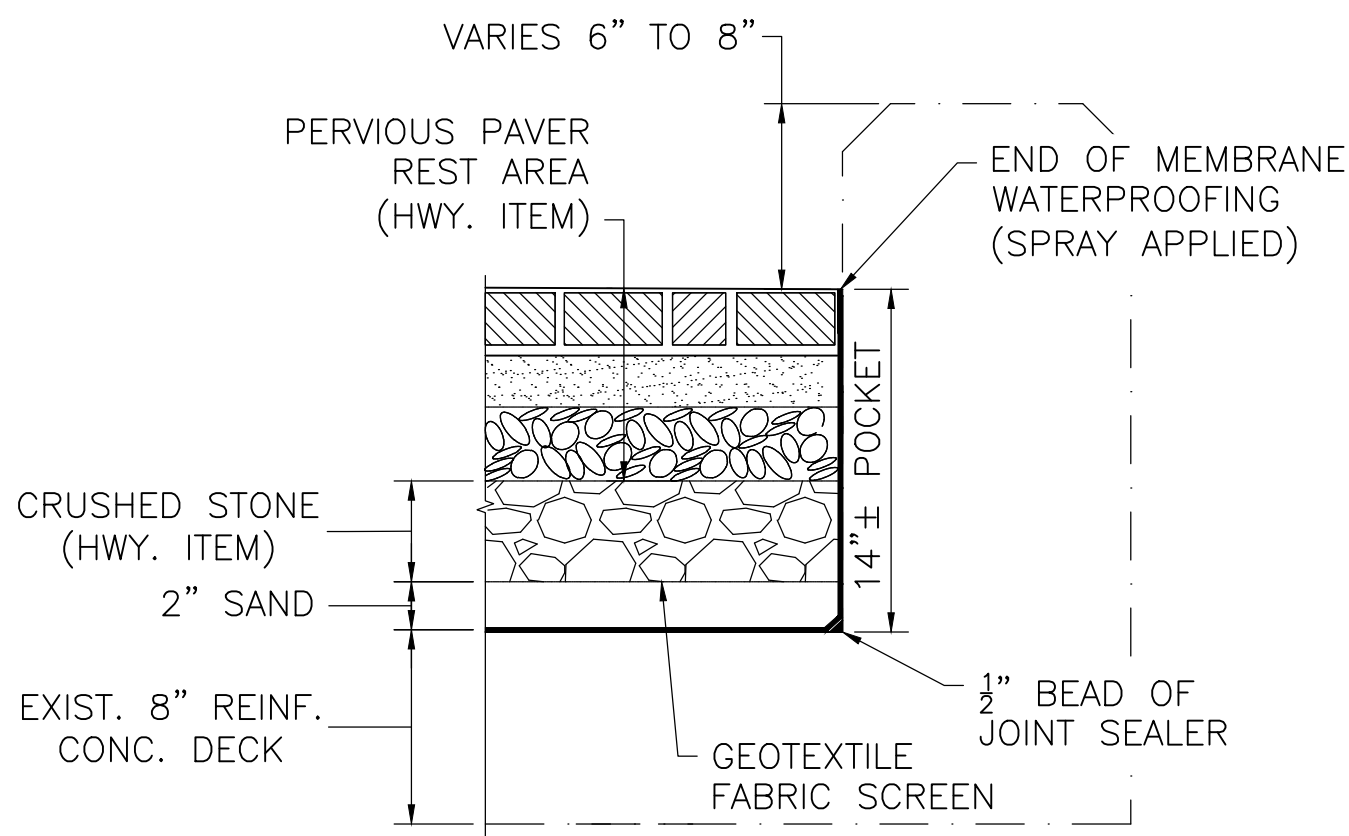


TIMBER BRIDGE RAIL DETAILS
SCALE: 3/4" = 1'-0"

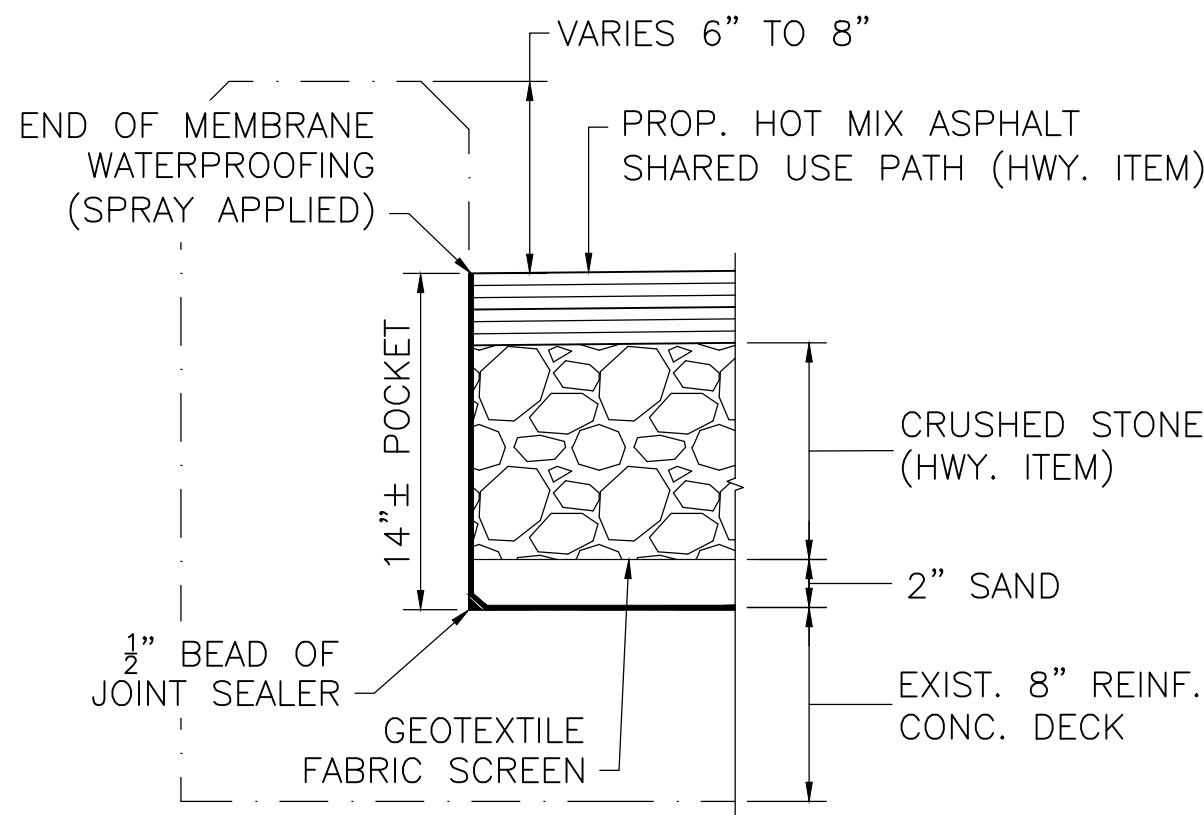


DECK PLAN
SCALE: 1 1/2" = 1'-0"

NOTE:
FOR LONGITUDINAL SPACING SEE EAST ELEVATION ON SH. 3 OF 5.



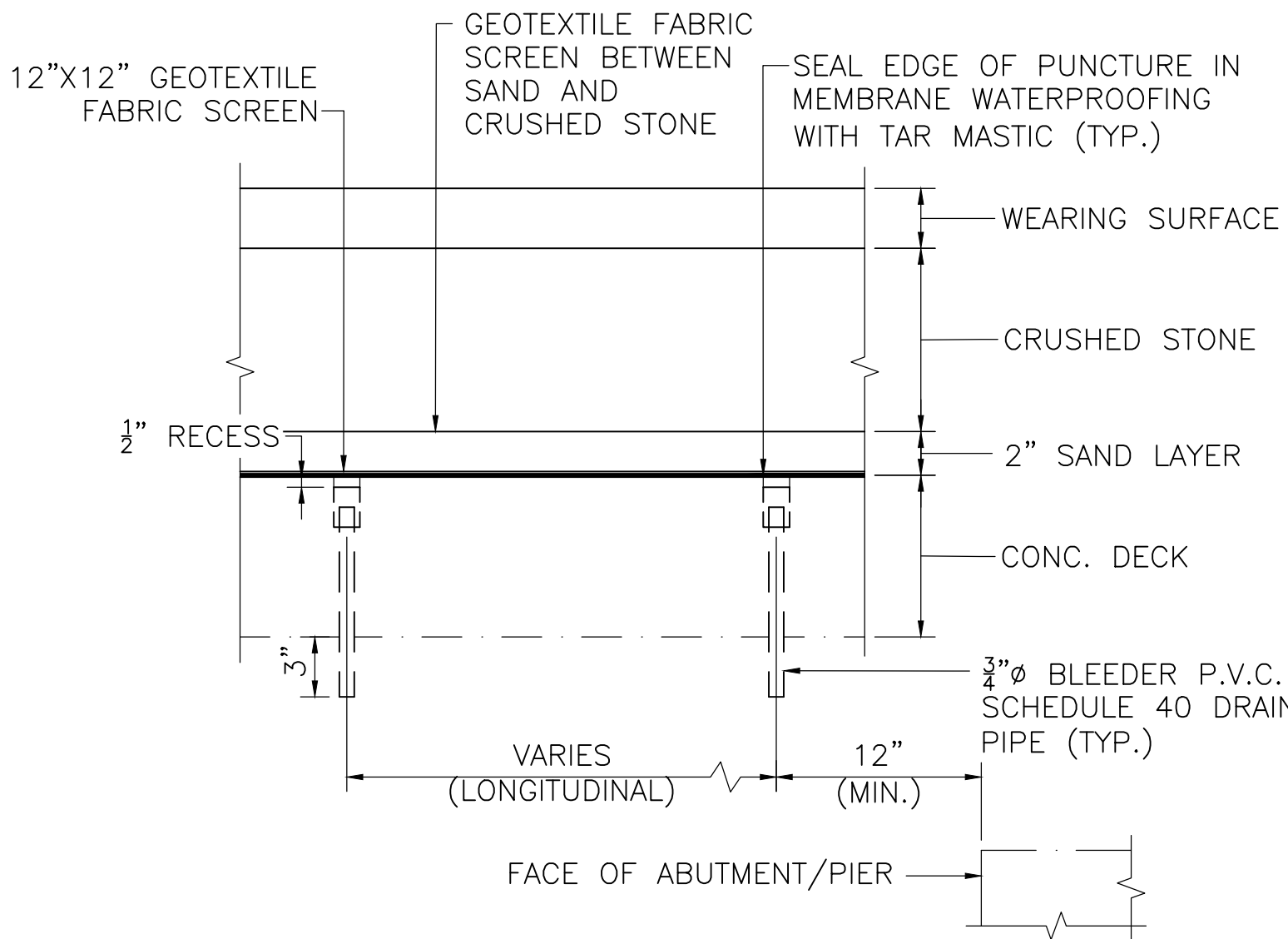
FACE OF CURB DETAILS
AT REST AREA
SCALE: 1 1/2" = 1'-0"



FACE OF CURB DETAILS
AT SHARED USE PATH
SCALE: 1 1/2" = 1'-0"

NOTES:

- TURN MEMBRANE UP INTO 14"± HIGH POCKET.
- DIMENSIONS AT THE FACE OF CURB ARE APPROXIMATE AND BASED ON FIELD MEASUREMENTS OF EXISTING CONCRETE.
- MEMBRANE WATERPROOFING SHALL EXTEND BEYOND THE EDGE OF DECK AT THE ABUTMENTS AS DIRECTED BY THE ENGINEER.

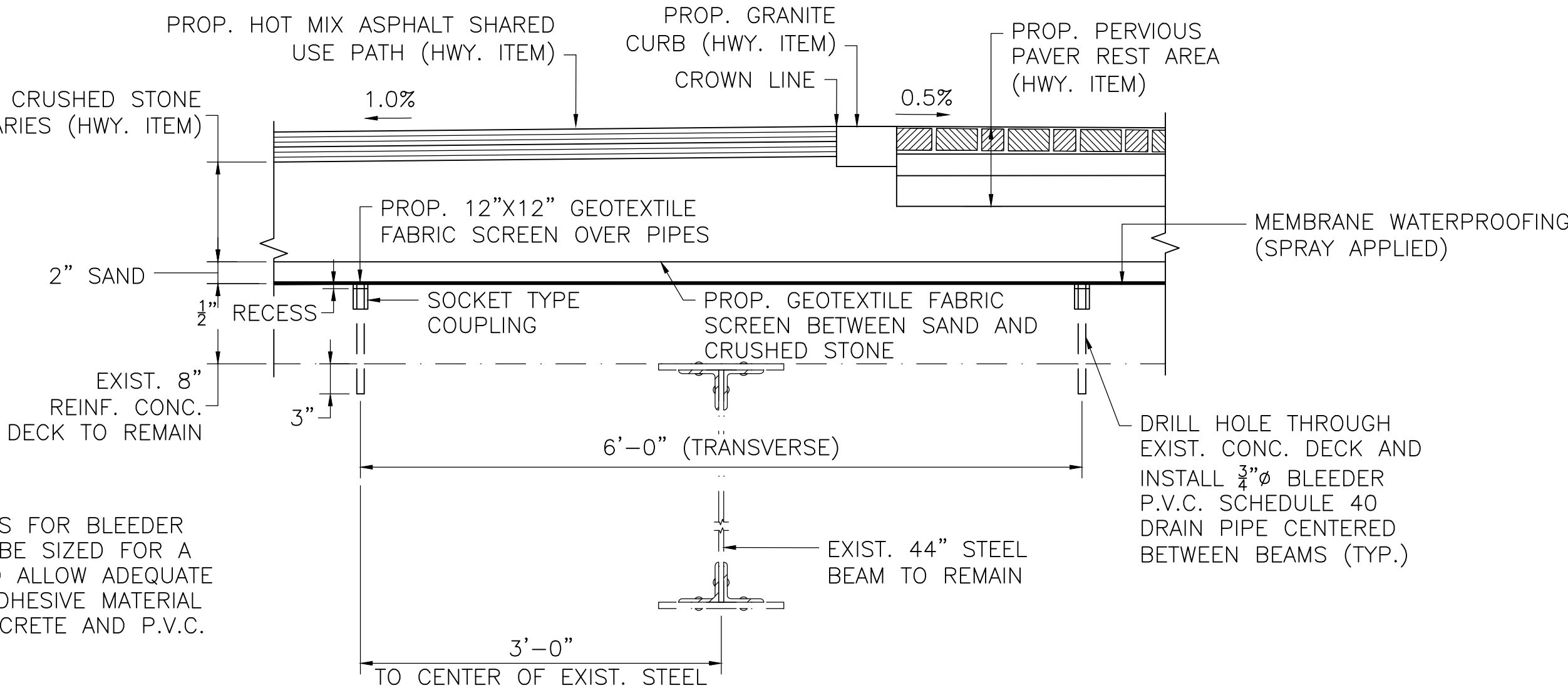


SECTION 1
SCALE: 1 1/2" = 1'-0"

BLEEDER (BRIDGE DECK) P.V.C. DETAILS
SCALE: AS NOTED

NOTES:

- DRILLED HOLES FOR BLEEDER PIPES SHALL BE SIZED FOR A TIGHT FIT AND ALLOW ADEQUATE SPACE FOR ADHESIVE MATERIAL BETWEEN CONCRETE AND P.V.C. PIPE.
- SEE ELEVATION ON SHEET 3 OF 5 FOR LONGITUDINAL SPACING.

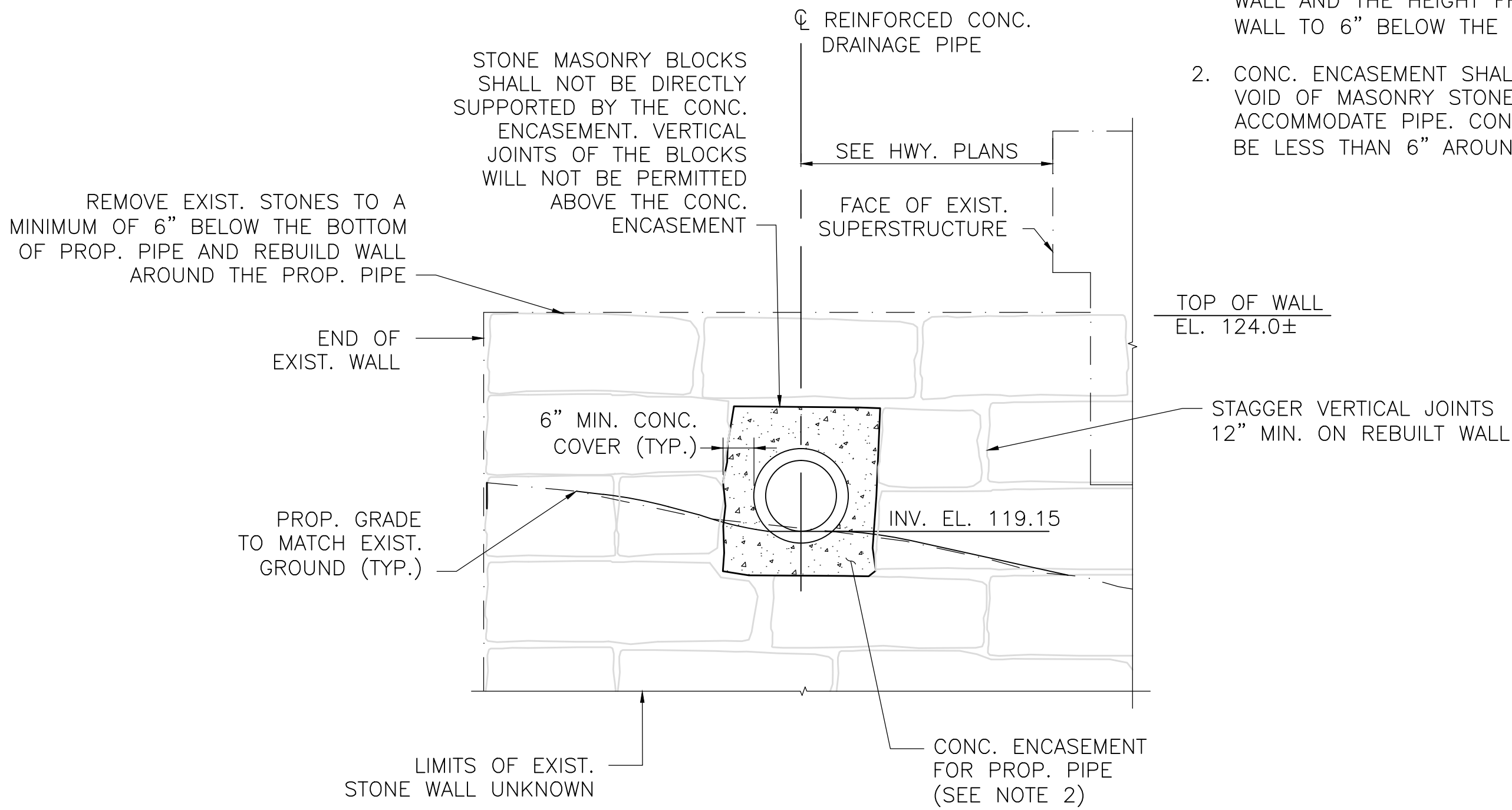


SECTION 2
SCALE: 1" = 1'-0"

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-----	276	328
PROJECT FILE NO. 605189			

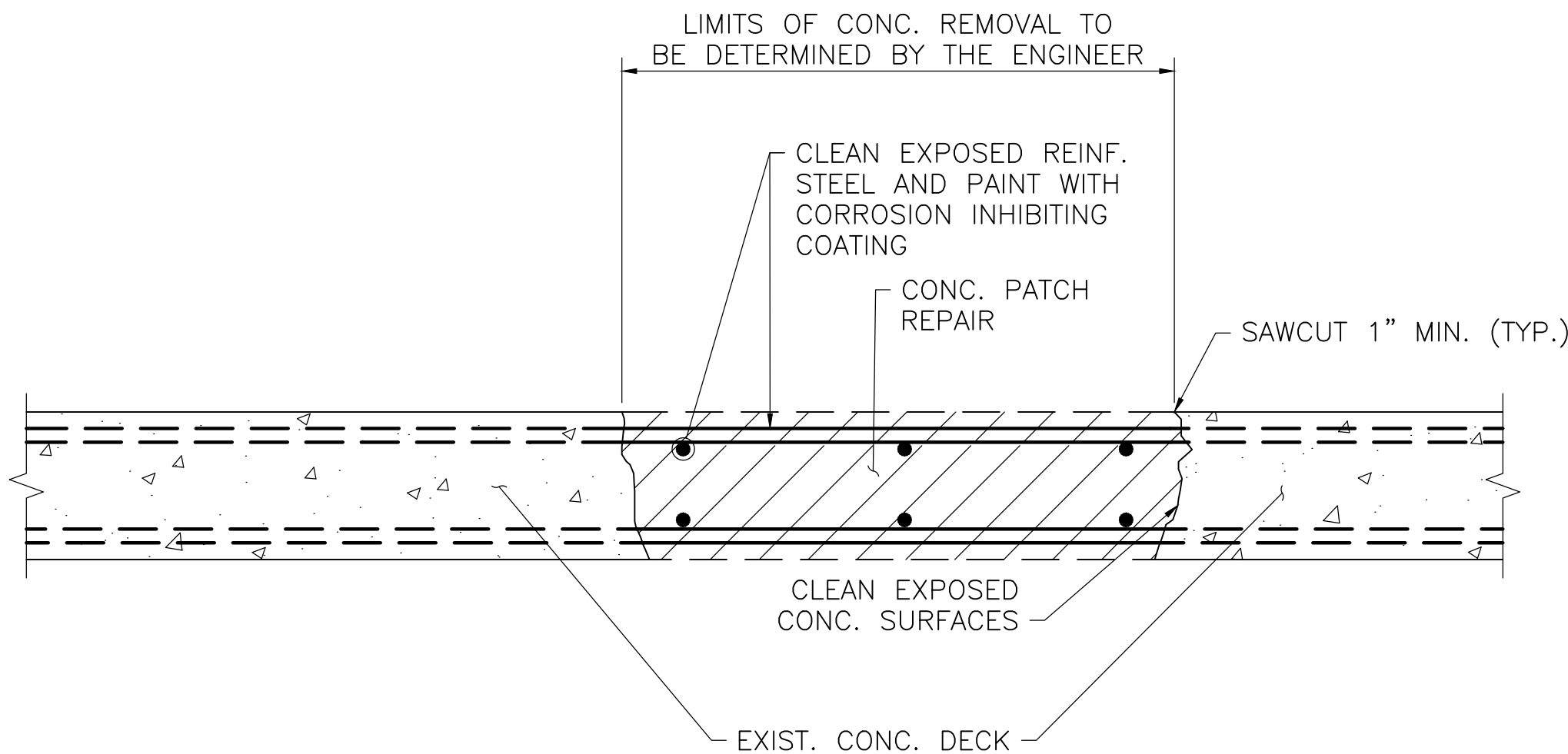
BRIDGE DETAILS



CONCRETE PIPE IN STONE MASONRY WALL DETAIL

SCALE: $\frac{1}{2}$ " = 1'-0"

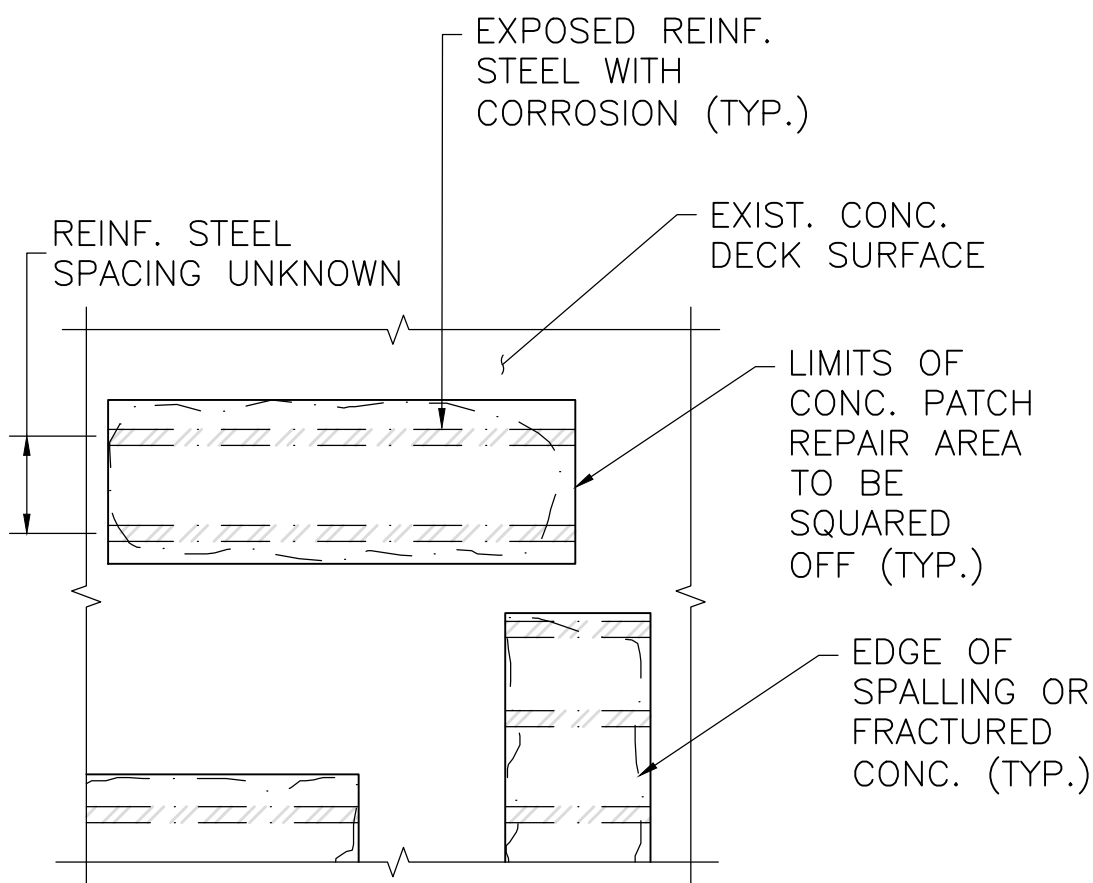
- NOTES:
- PAYMENT LIMITS OF EXISTING STONE MASONRY REMOVAL EQUAL THE WIDTH AND DEPTH OF THE EXIST WALL AND THE HEIGHT FROM THE TOP OF THE EXIST. WALL TO 6" BELOW THE BOTTOM OF THE PROP. PIPE.
 - CONC. ENCASEMENT SHALL BE PLACED TO FILL ENTIRE VOID OF MASONRY STONES REMOVED TO ACCOMMODATE PIPE. CONC. ENCASEMENT SHALL NOT BE LESS THAN 6" AROUND THE PIPE



CONCRETE DECK FULL DEPTH PATCH REPAIR

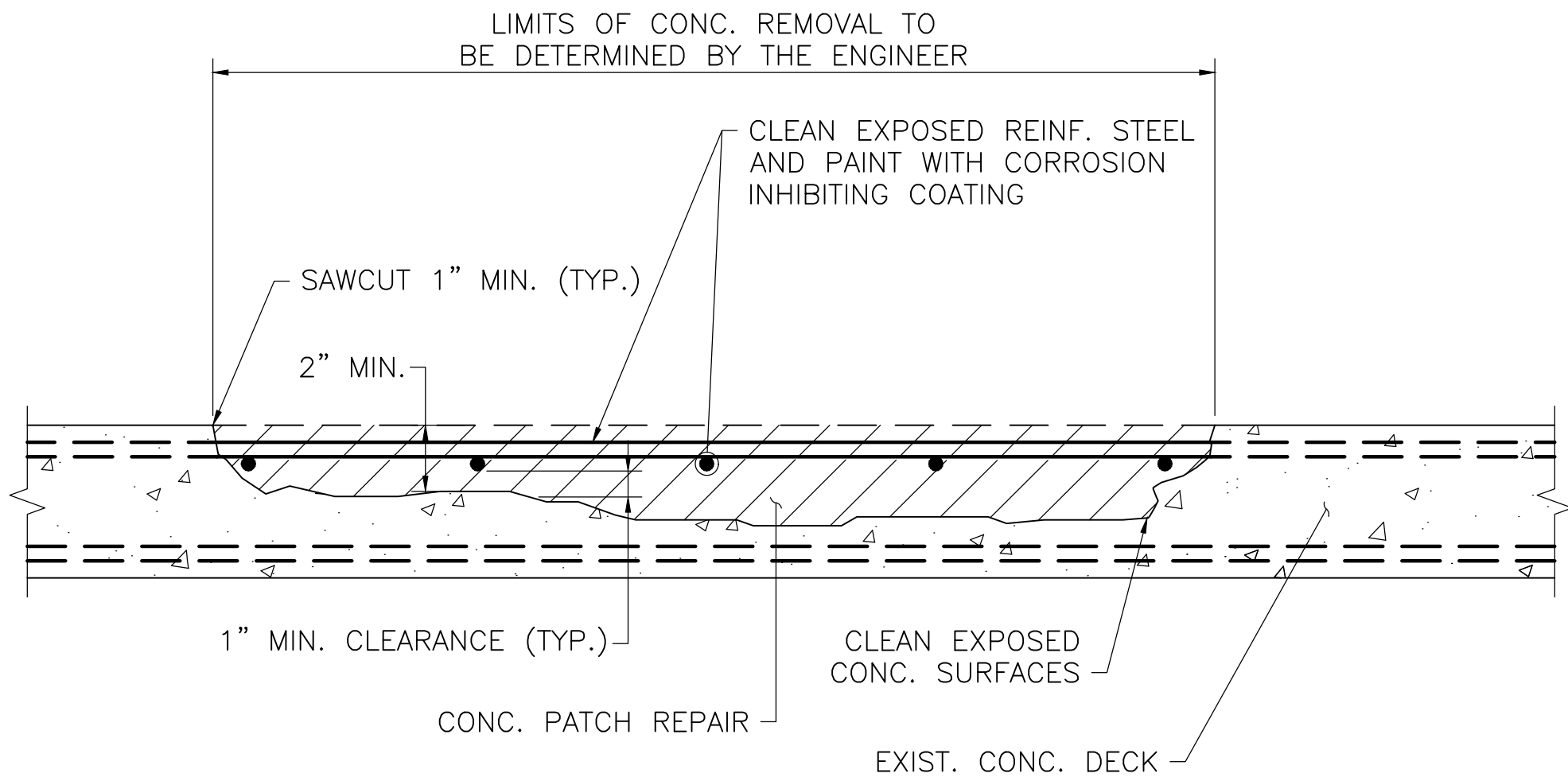
SCALE: $1\frac{1}{2}$ " = 1'-0"

- NOTES:
- SIZE, LOCATION AND QUANTITY OF CONCRETE SPALLS ARE UNKNOWN AND SHALL BE DETERMINED BY THE ENGINEER PRIOR TO COMPLETING PATCH REPAIRS.
 - THE SURFACE OF THE EXIST. OR PREVIOUSLY CAST CONC. SHALL BE BLAST CLEANED, ROUGHENED, WETTED WITH CLEAN WATER, AND THEN FLUSHED WITH A MORTAR COMPOSED OF EQUAL PARTS OF THE CEMENT AND SAND SPECIFIED FOR THE NEW CONC., BEFORE THE NEW CONC IS PLACED ADJACENT THERETO. NEW CONC. SHALL BE PLACED BEFORE THE MORTAR HAS TAKEN INITIAL SET.
 - PATCH REPAIR CONCRETE SHALL BE 4000 PSI, $\frac{3}{4}$ ", 585 HP CEMENT CONC.



CONCRETE DECK PATCH REPAIR-PLAN VIEW

SCALE: 1" = 1'-0"



CONCRETE DECK PARTIAL DEPTH PATCH REPAIR

SCALE: $1\frac{1}{2}$ " = 1'-0"

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	